

C677

A Special Report  
on the field of  
Non-Woven Textiles  
Page 57

# Textile bulletin

OCTOBER • 1957

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## NON-FLUID OIL

TRADE MARK REGISTERED

## INCREASES LOOM OUTPUT

NON-FLUID OIL, the leading lubricant in the textile field, *increases* loom production *because—*

Drip-proof and waste-proof, it remains in the bearings where it belongs  
—and off the goods and floors.

It provides constant lubrication, keeping machines in steady service.

Dripping, leaking ordinary oil won't stay in bearings but creeps and spatters on warps, goods and floor, causing oil spot "seconds" — thus lowering loom production and "upping" oil and application costs.

Seven out of ten mills use NON-FLUID OIL. To convince yourself that it provides cleaner and better lubrication at less cost than ordinary oils, write today for Bulletin T-20 and a free testing sample.

## NEW YORK & NEW JERSEY LUBRICANT CO.

292 Madison Avenue, New York 17, New York

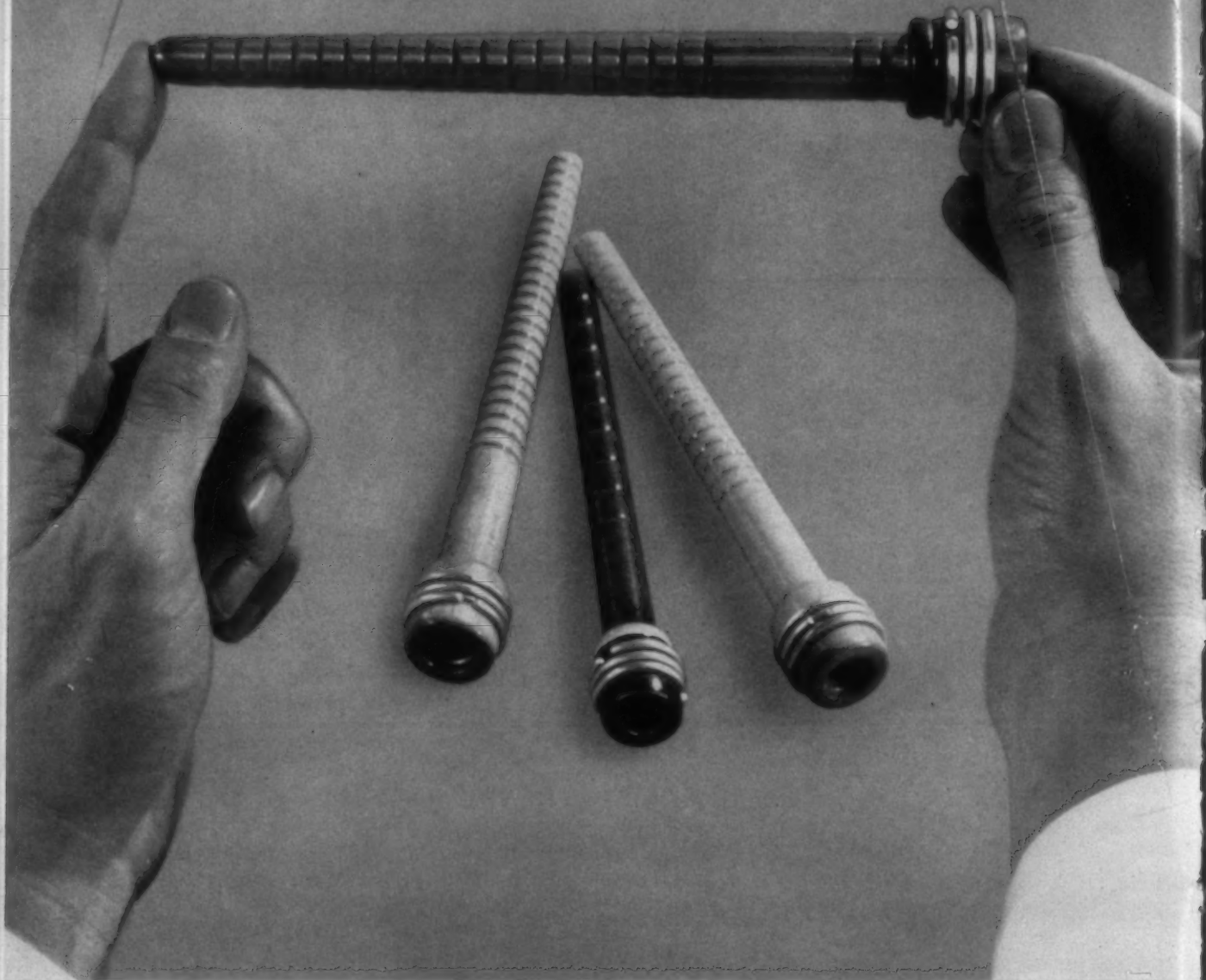
Southern District Manager: Lewis W. Thomason, Jr., Charlotte, N. C.

WAREHOUSES: Atlanta, Ga., Birmingham, Ala., Charlotte, N. C., Chicago, Ill., Columbus, Ga., Detroit, Mich., Greensboro, N. C., Greenville, S. C., Providence, R. I., St. Louis, Mo., Springfield, Mass.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.

THE BULLETIN is published  
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18 West Morehead St.,  
Charlotte 6, N.C. Subscription  
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second-class mail matter  
June 2, 1911, at Postoffice,  
Charlotte, N. C., under Act  
of Congress, March 2, 1897.





## From Tip to Butt . . .

A Draper bobbin incorporates all of the features found to be desirable in a quality bobbin;

1. Finest raw materials
2. Engineering . . . by men who *know* bobbin requirements
3. Uniformity in manufacture
4. Proven finishes

Each Draper bobbin is a custom-made example of precision production wherein minimum tolerances, consistent with a practical woodworking operation, are maintained.

The cost of an individual bobbin is small, but annual mill expense for bobbins is considerable. Specify the best for *both quality and economy* . . . a Draper bobbin.



**DRAPER  
CORPORATION**

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Customer satisfaction  
depends on your package...



## Single Head Spools

FOR INDUSTRIAL THREAD

# MAKE YOUR PACKAGES BETTER



Economical SONOCO Single Head Spools provide an ideal foundation for industrial thread packages. The tapered base permits free delivery and uniform tension. Your customers want thread wound on SONOCO Single Head Spools to insure top take-off performance.

These carriers are an original SONOCO development and are industry-accepted for packaging all types of industrial thread. Special scoring and surfaces available to meet your specific need. Colored lacquer tips may be ordered for identification.

SONOCO also furnishes plastic single head spools in various colors.

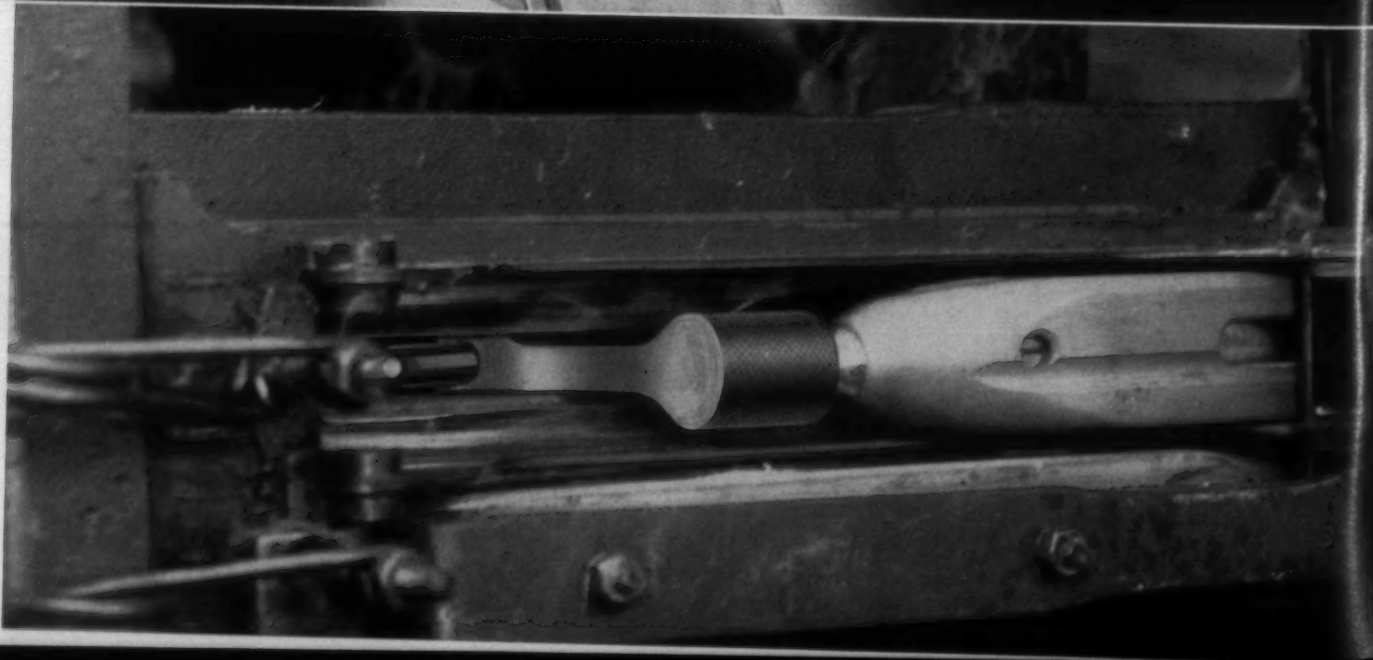
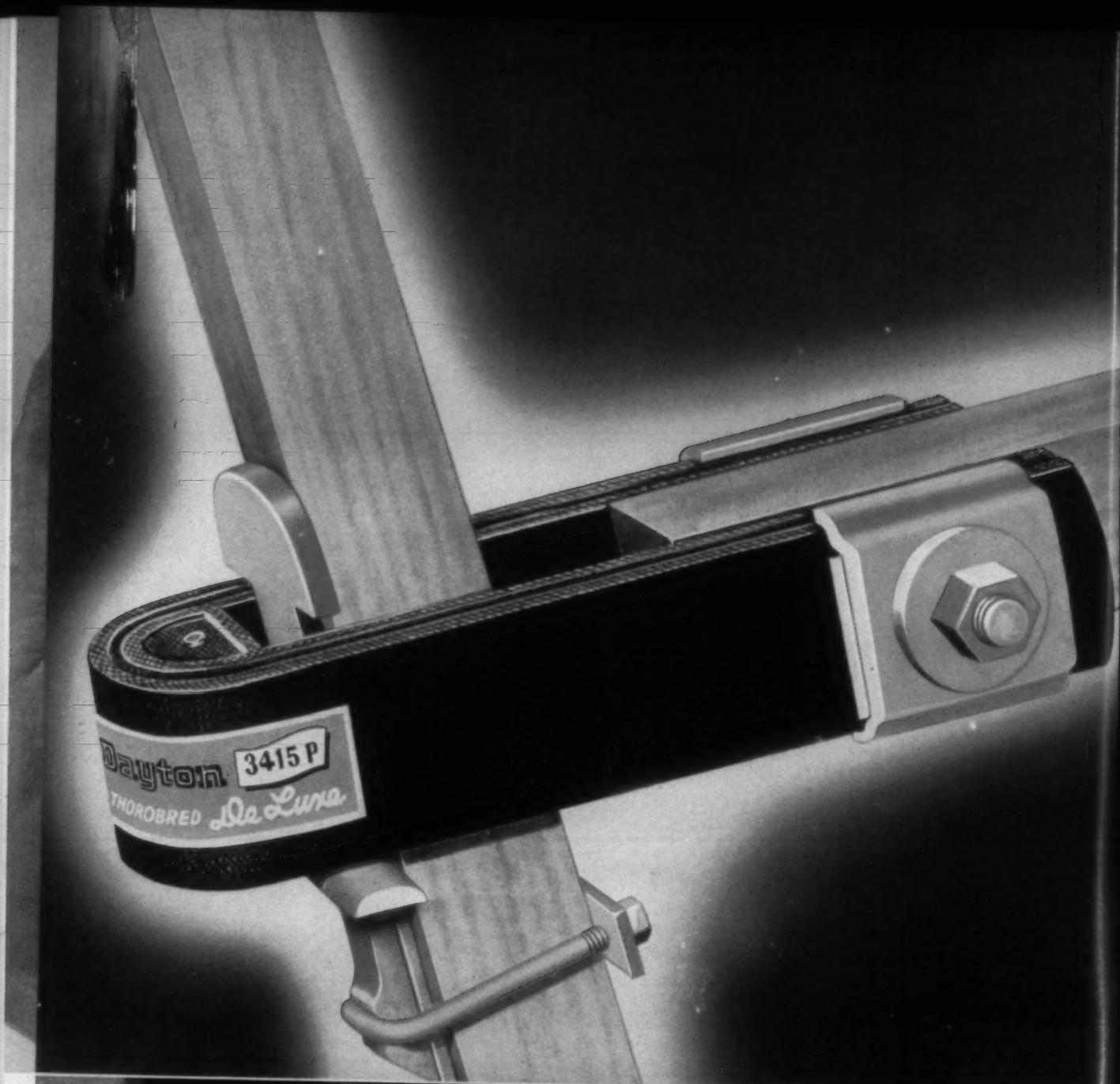
Remember—good packages depend on good carriers...  
order SONOCO Single Head Spools now!



## SONOCO PRODUCTS COMPANY

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LONGVIEW, TEXAS • PHILADELPHIA, PA. • LOS ANGELES, CAL.  
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Protect all points of shock

# increase production and lower operating costs

With Dayton Thorobred

**Deluxe Lug Straps  
Drop Box Pickers**

Install Dayton Thorobred Drop Box Pickers and Deluxe Lug Straps and you immediately provide *double* protection against shock for expensive loom parts. They'll take millions of shuttle contacts and picker stick thrusts without fatigue. Because of their scientific construction they offer the *exact amount of shock absorption needed for the specific degree of shock at each and every point of contact*. Check these construction features:

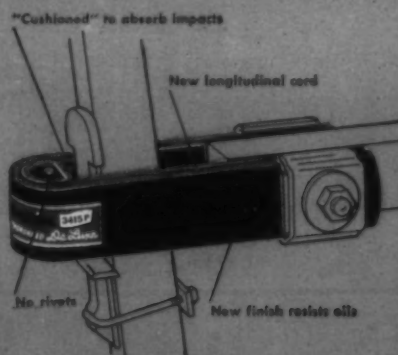
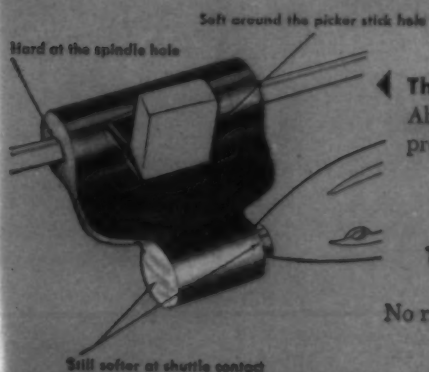
**Dayton Thorobred Deluxe Lug Straps**, having a one piece, rivet-free construction, give twice the service of ordinary straps. The molded plug, built into the strap loop, cushions the thrusts of the picker stick in rapid motion. Added strength is gained from a longitudinal cord in the center of the lug. Easily applied, they work perfectly in any weather.

**Dayton Thorobred Drop Box Pickers, built with 3-Point Density control, provide:**

1. Extra hard composition in the bearing surface around the spindle hole.
2. Softer composition around the picker hole to take terrific impacts, reduce stick wear.
3. Still softer composition at the shuttle contact to prevent loosening of shuttle point.

Dayton Drop Box Pickers are available in reversible or non-reversible construction.

To double your protection of expensive, related loom parts, increase production and cut costs ask your Dayton Jobber for additional details — he'll be calling on you soon. Or write direct to The Dayton Rubber Co., Textile Division, 401 S. C. National Bank Bldg., Greenville, S. C.



## Dayton Rubber

Dayco and Thorobred Textile Products for Better Spinning and Weaving

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Jacques Wolf Textile Printing Chemicals

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Plants in: Clifton, N.J., Carlstadt, N.J., Los Angeles, Calif.

## PRINTING

**SUPERCLEAR\***—All viscosities. Used for machine and screen printing of all types of textile fabrics. Produces bright prints with sharp outlines and very fine detail. Also used extensively to prevent migration of colors in dyeing.

**SUPER GUM H**—Full flow for roller and screen printing application. High color value, easy to handle. Compatible with all colors. Effective with acid or alkaline medium.

**GUM TRAGACANTH SOLUTION**—Made by a patented process. Used with Acid, Direct or Insoluble Azo Dyestuffs for screen printing, this gum gives exceptionally clear, sharp prints.

**SCREEN GUM W-1141-B**—Used as a thickener for Rapidogen and Indigosol type dyestuffs. Good color value; excellent mark and washes easily.

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## MORDANTS

**ACETATE OF CHROME, ALUMINUM ACETATE, ALUMINUM FORMATE**

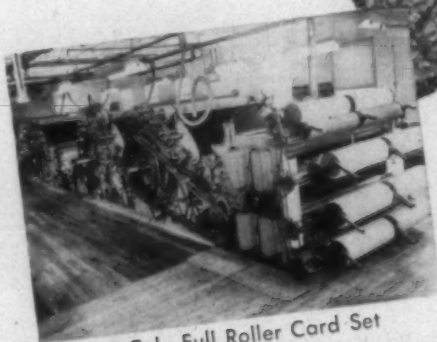
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**JACQUES WOLF & CO.**  
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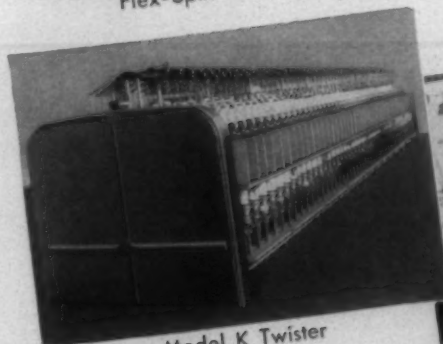
# Put *Magic* In YOUR carpets with carpet yarns prepared and processed on WHITIN MACHINERY



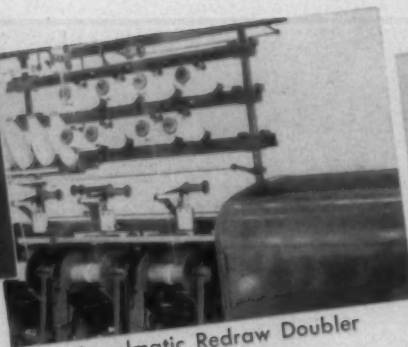
3-Cyl., Full Roller Card Set



Flex-Spin Wool Spinning



Model K Twister



Spoolmatic Redraw Doubler



Cable-King Uptwister

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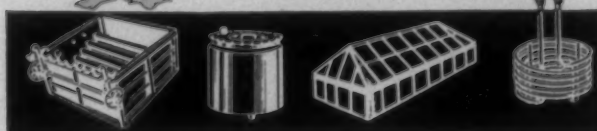
Furnished Teflon-coated if desired.

**FOR ECONOMY AND QUALITY** Our modern and progressive metal-working shops, our skilled craftsmen, our know how—these are guarantees of quality. For custom tailoring of stainless steel, call, wire, or write now.



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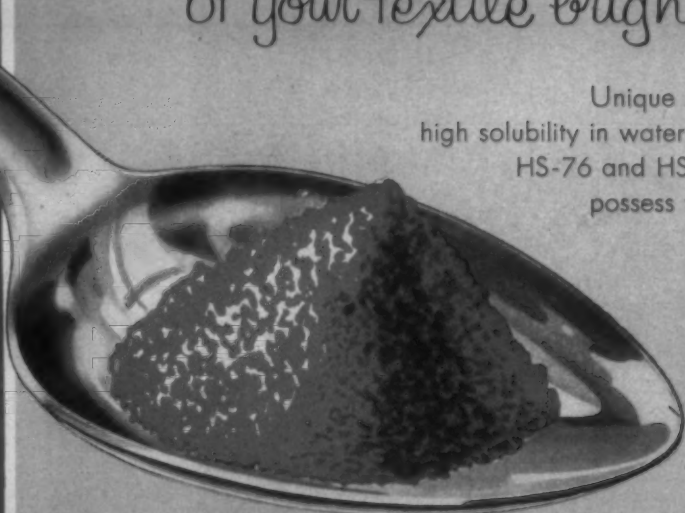
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Unique because of their exceptionally high solubility in water, BLANCOPHOR HS-71, HS-76 and HS-31 optical whitening agents possess these quality features:

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- \* Produce clear, brilliant whites on bleached textiles.
- \* Outstanding in their level dyeing properties.
- \* Suitable for use in all types of equipment, such as jigs, reel or package machine.



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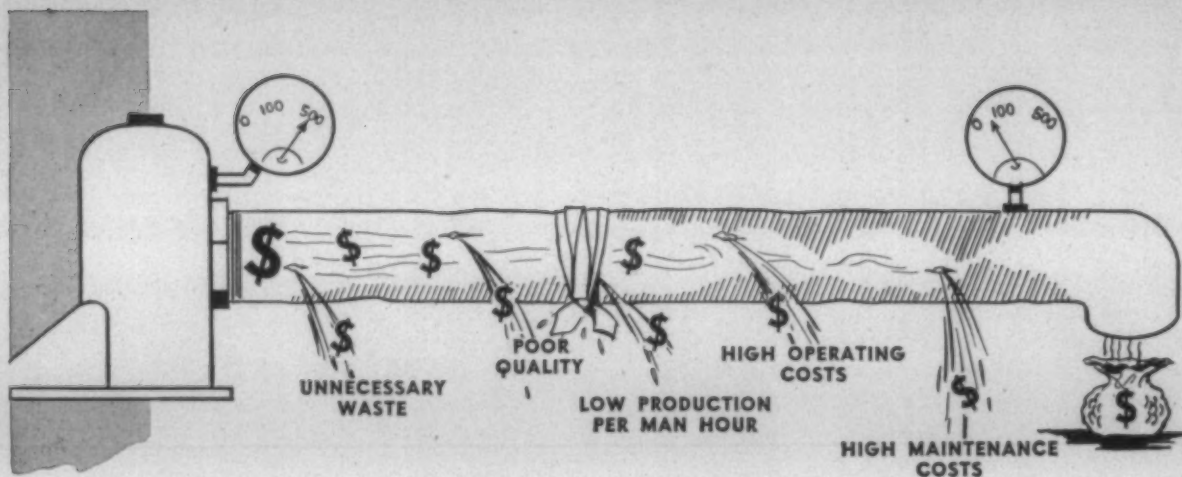
A SALES DIVISION OF

**GENERAL ANILINE & FILM CORPORATION**

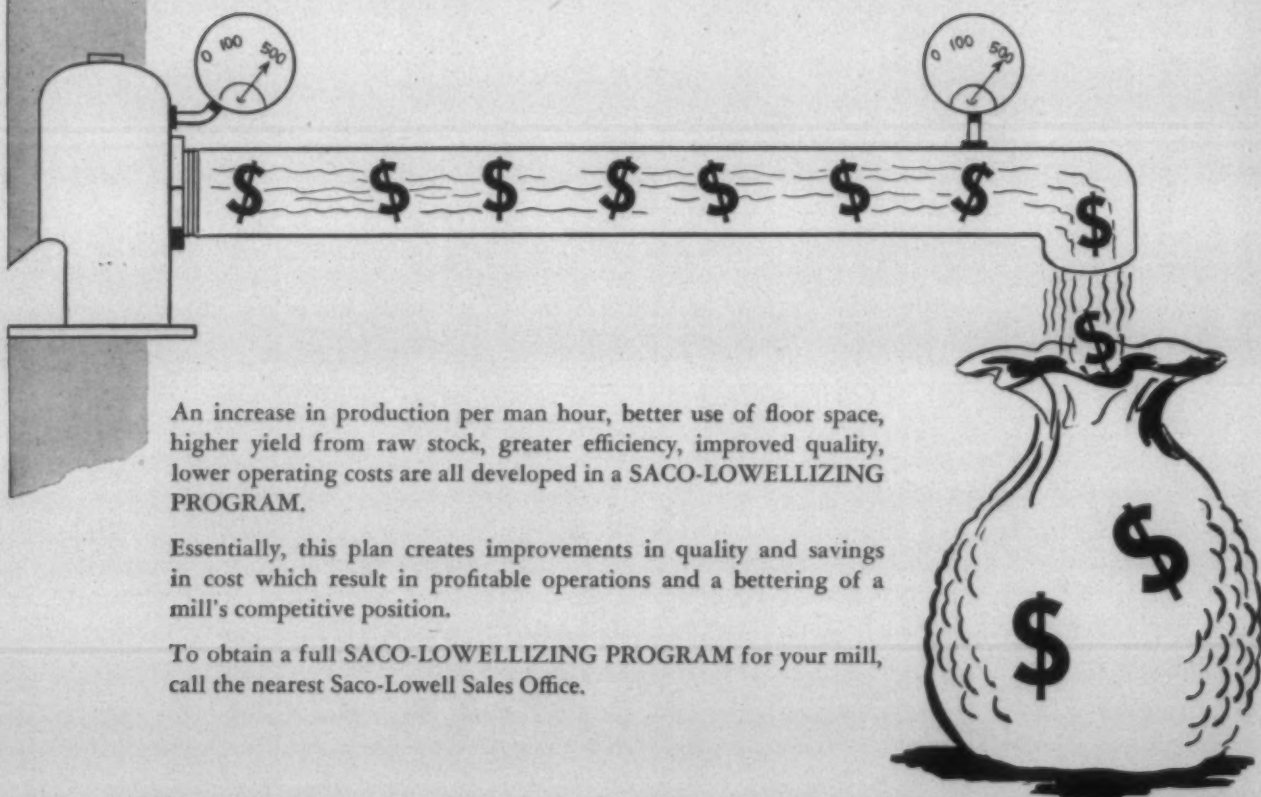
435 HUDSON STREET • NEW YORK 14, NEW YORK

SALES OFFICES: New York • Boston • Providence • Philadelphia • Charlotte • Chattanooga • Chicago  
Portland, Ore. • San Francisco • Los Angeles. IN CANADA: Chemical Developments of Canada, Ltd., Montreal

Blancophor HS-71, HS-76 and HS-31 manufactured by General Aniline & Film Corporation are sold outside the United States under the trade names, respectively, Tintofen DP, Tintofen D and Tintofen DP Liquid.



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National Aniline is amply staffed to render exceptionally fine technical service. Our representatives spend much of their time in the mills. And they are well supported by the fast, accurate work of strategically located Application Service Laboratories.

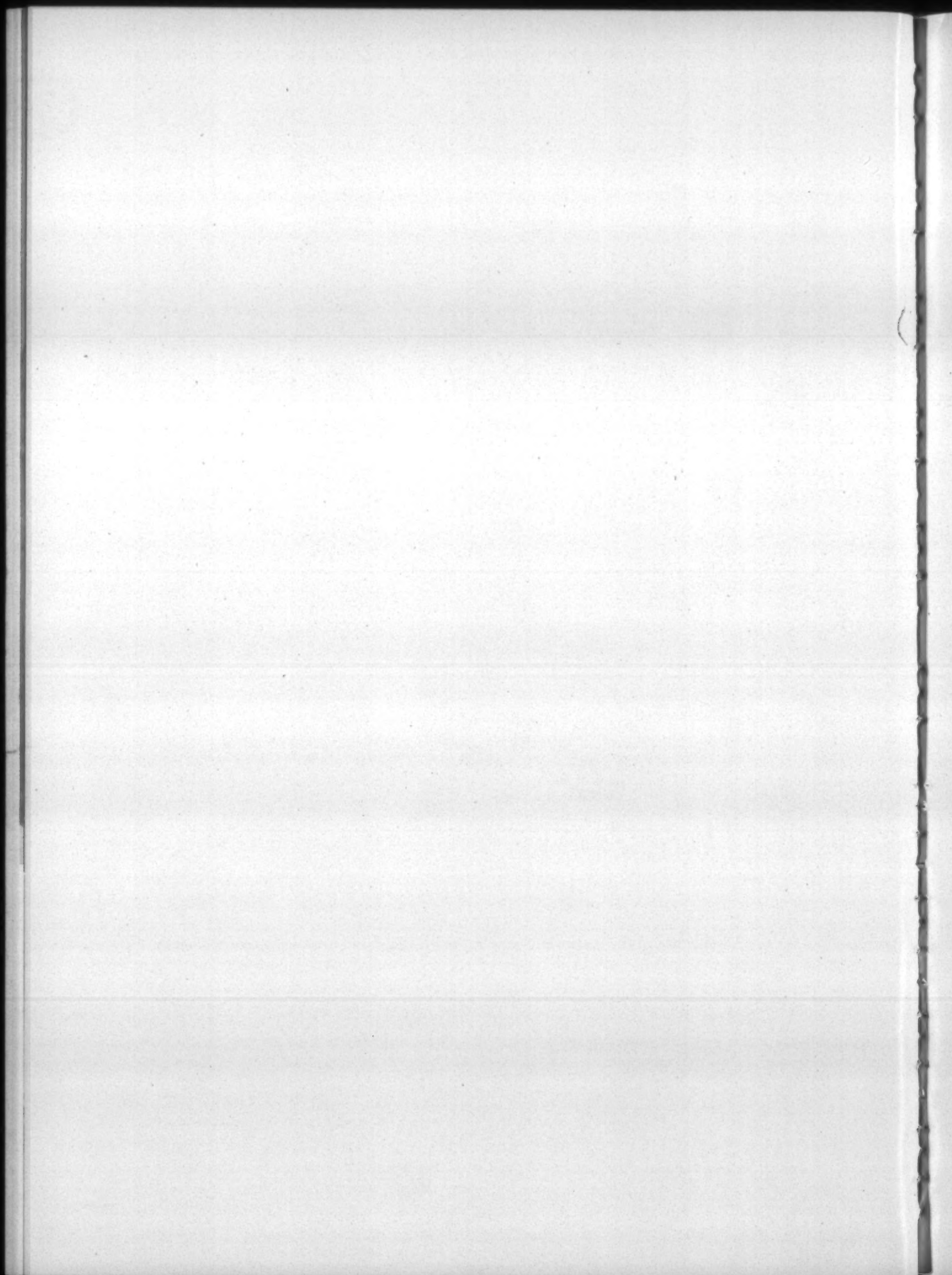
Backing up this on-the-job service are the industry's most complete shade cards, Standardization Control Laboratories to assure unerring product uniformity, and constant basic research on still better dyes and application methods.

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# Perfected Cleaning! ceiling to floor

- Each unit self-propelled.
- Independent air streams for room surfaces, frame areas, floor.
- Air directions and velocities are adjustable. Automatic dampers available.
- Sleeves below head height are flexible.
- Frame cleaner adaptable to all creels.

**ROOM CLEANER** (revolving continuously) for ceiling and other overhead surfaces. High velocity air.

## FRAME CLEANER

Rugged track with shielded electric contactors.

Short sleeve for top creel board, tapers and spare roving.

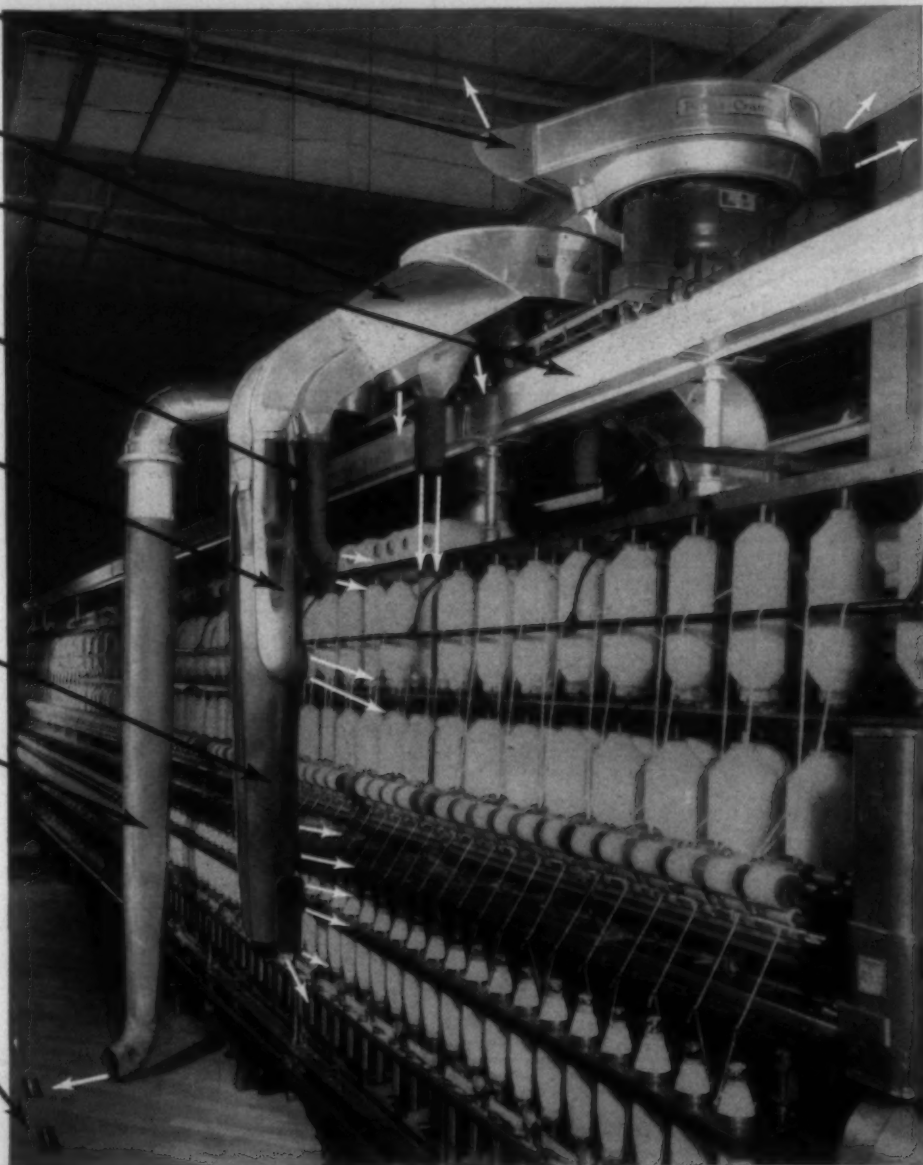
Medium length sleeve for middle creel board and roving tapers.

Long multi-outlet sleeve for bottom creel, thread board, roll stand area, ring rail, spindle rail and under-frame. High velocity air.

## FLOOR SWEEPER

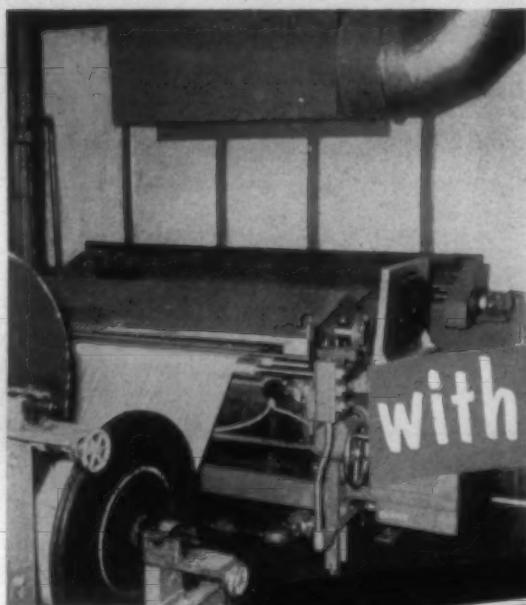
Floor sweeper outlet turns on curves. Low velocity air.

Vacuum removal of floor sweepings at two or more alleys.



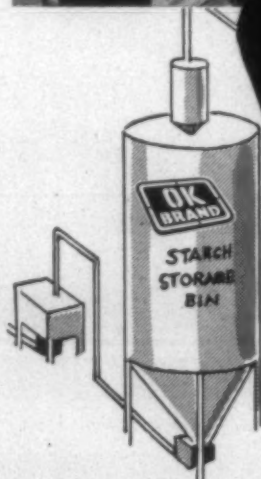
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sizing, printing,  
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**with the Greatest of Ease**  
with



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and GUMS**

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1817 Dell Drive  
Columbus, Georgia  
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**BOSTON OFFICE**  
192 State Street  
Boston, Mass.  
(Phone: Capitol 7-3268)

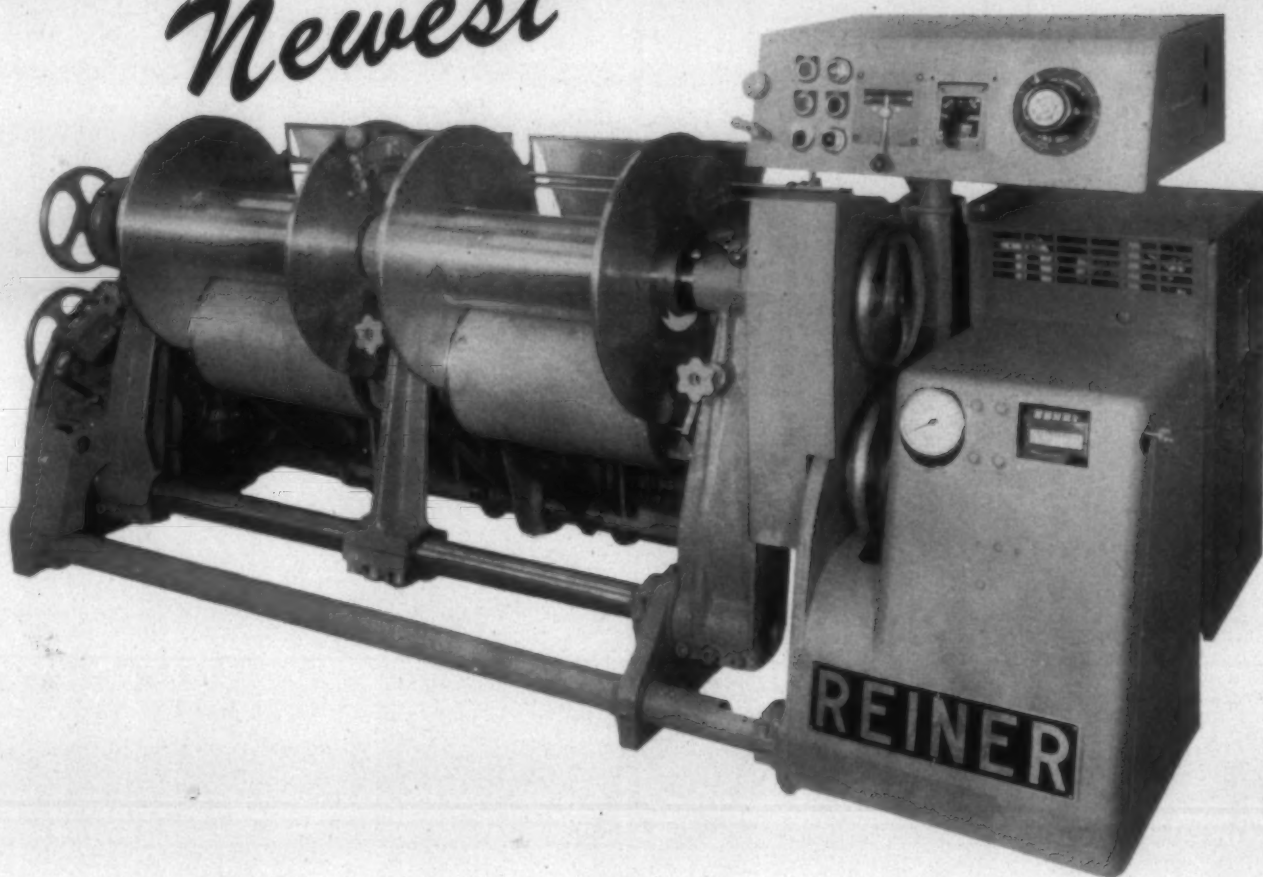
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New York 36, New York  
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# The Hubinger Company

**KEOKUK, IOWA**



**HERE IS THE**  
*Newest*



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From cone to finished fabric . . .

there is nothing finer than

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Reiner offers a full line of equipment which includes: Knitting Machines — Warpings — Beamers — Creels — Famatex Tenter Frames — Gerber Wet Finishing Machines — Gauged Doubling, Measuring and Examining Machines, Cloth Control and Marking Devices, etc., plus a ready supply of spare parts.

- Reduce warping costs
- Save beam expenses
- Reduce yarn strain and imperfections
- Simplify operation
- Permit warping of either one 42" tricot beam, or two 21" tricot beams simultaneously

### **FEATURES:**

- Low, compact, functional design throughout
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- Automatic doffing from beam carrier wagon, floor or dolly
- Can also be built for single 21"—42"—50" and 84" beams, or dual 42" Tricot/50" Raschel warper

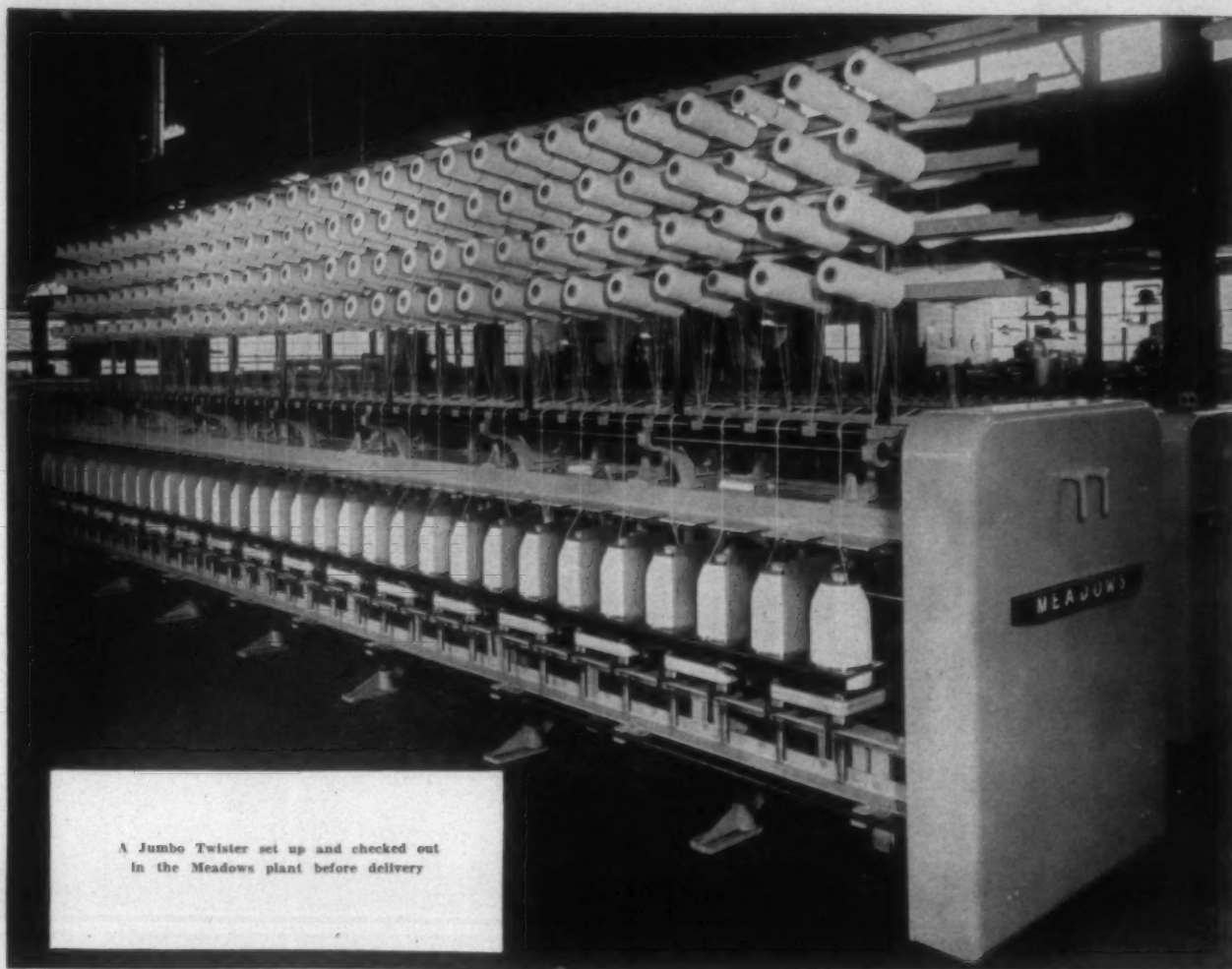
## **ROBERT REINER, INCORPORATED**

Telephone: UNion 7-0502—From New York City call LOngacre 4-6882.

**WEEHAWKEN**

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**NEW JERSEY**



A Jumbo Twister set up and checked out  
in the Meadows plant before delivery

## *A completely new, completely* **ANTI-FRICTION JUMBO TWISTER by MEADOWS**

This twister has a 10" gauge; 8" diameter ring; carries a bobbin 14" overall, 12" build. This means a 9 lb. package of knotless yarn on numbers as coarse as 8/8.

It is as completely anti-friction as a frame can be made. All gear-end studs and roll stands are ball bearing. Individual drive pulleys and shafting are ball-bearing mounted. Double ball-bearing tension pulleys make reversing easy. Lifter rod bushings have been eliminated, replaced with anti-friction rollers. Even the builder motion is anti-friction.

It is a sturdy frame—of steel construction: base rails, roller beams, ring-rails, head and foot ends, doors . . . all are steel.

Our twister frames will run bobbins from 10 to 15 inches. They can be operated at higher speeds than any competitive twister. We can supply twisters from the smallest to the largest in gauge and ring.

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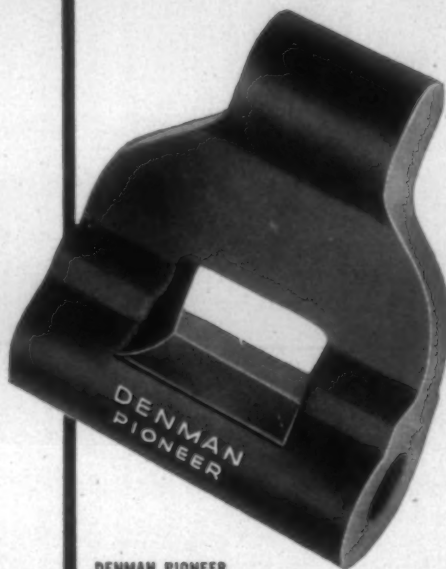


*Exclusive*  
PATENTED CONSTRUCTION!

# Denman

## PIONEER DROP BOX REVERSIBLE PICKERS

- ★ Greater Strength
- ★ More Resiliency
- ★ Longer Life



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DROP BOX REVERSIBLE PICKER



DENMAN PIONEER  
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DENMAN  
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HOLD-UP STRAP



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SPINDLE ROD BUMPER



### SAVES PICKER STICK WEAR AND TEAR!... INCREASES LOOM EFFICIENCY!

Denman's Drop Box picker construction eliminates the weak spots in other pickers.

The insertion of the patented wedge provides a strong, smoothly tapered web, completely free from wrinkles. This exclusive feature also eliminates the resin-leak into the picker stick aperture. This leak often forms rough spots in other pickers which abrade and wear the picker stick.

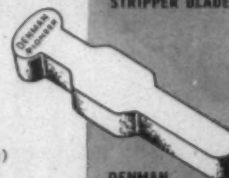
For greater efficiency and economy, for smooth performance, specify precision engineered and crafted original Denman Pioneer Loom Parts, famous for more than twenty years.



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**but caustic isn't shipped**

*"as the crow flies"*

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Liquid 50%, Regular  
and Low-Chloride Grades  
Flake, Solid and Ground, 76% Na<sub>2</sub>O

**CAUSTIC POTASH**

45% and 50% Liquid  
Flake and Solid

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Next time you are in the market for caustic, try Westvaco. You'll find us an unusually alert and dependable source of supply.

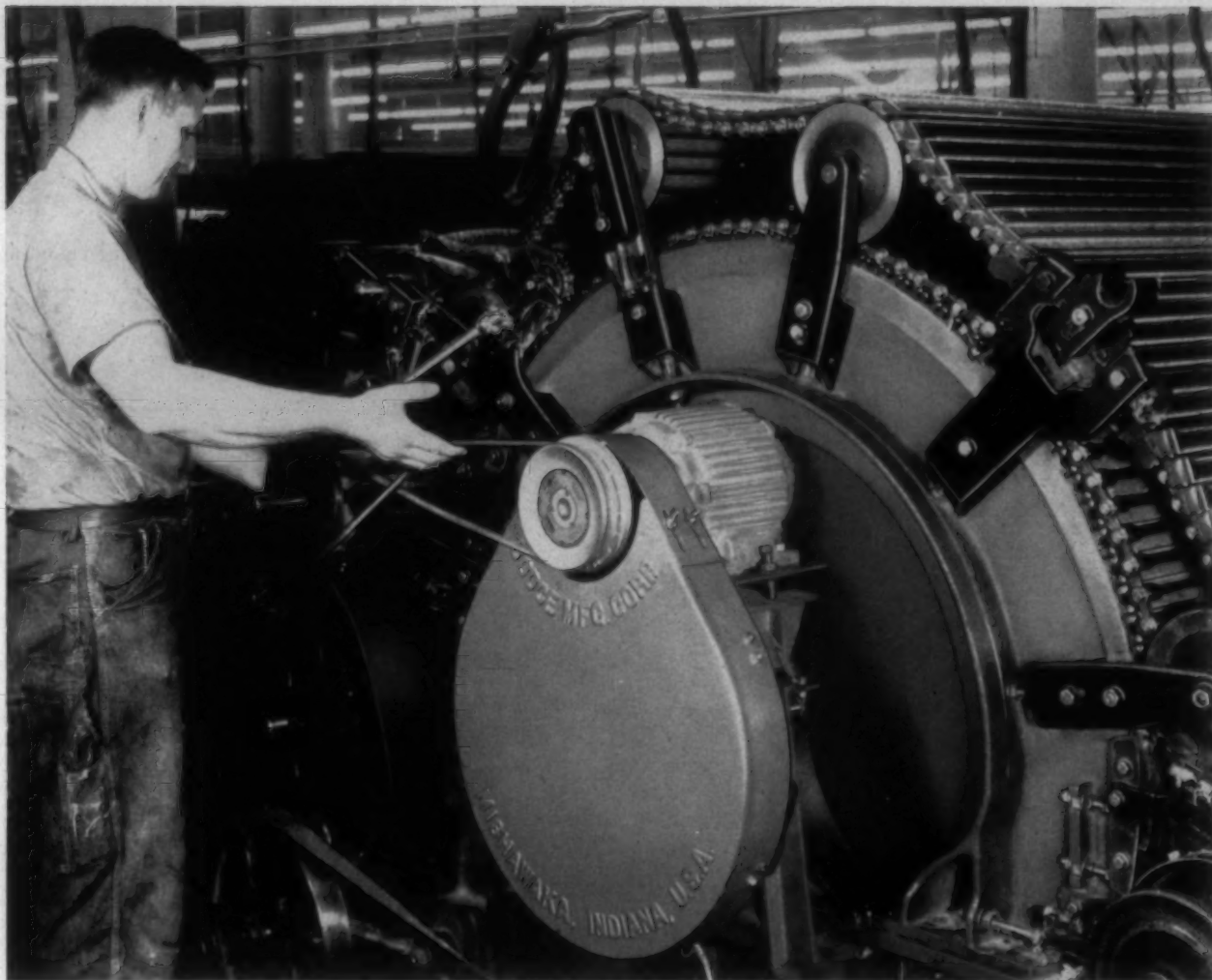
**fmc**

*chemicals*

**Westvaco Chlor-Alkali Division**  
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Flexidyne, heart of this new complete Card Drive by Dodge, picks up the load smoothly... protects machinery and motor against shock and overload... delivers 100% efficiency during running cycle. Flexidyne, the *Dry Fluid Drive*, eliminates need for high torque motors and expensive controls, saves power, provides a new and better way to drive textile machines. Note the special aluminum pulley mounted

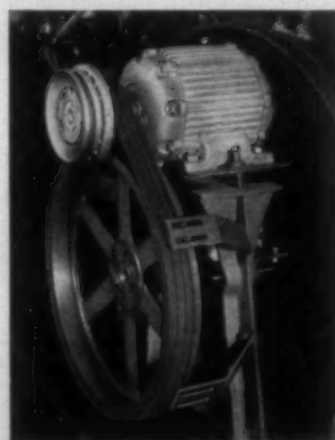
on Flexidyne housing, enabling quick, convenient operation of stripper. Pedestal has adjustable motor base to control tension on V-belts. You should have the full story of all the advantages of the new Dodge Flexidyne Card Drive. Ask your local Dodge Distributor, or write us, for new illustrated Bulletin A-653.

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**NEW! FLEXIDYNE CARD DRIVE**

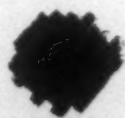
**A complete package, ready to install.**

- Flexidyne, keyed to motor shaft
- Pedestal, supporting motor
- V-flat drive
- Aluminum stripper pulley
- Aluminum guard

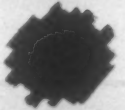


## Announcing 3 new "SEVRON"\* colors

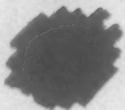
offering outstanding lightfastness and wetfastness  
in dyeing "ORLON"\* in men's suiting shades



"SEVRON"  
RED GL



"SEVRON"  
BLUE BGL



"SEVRON"  
YELLOW 3RL

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Information on the three new colors and on the entire "SEVRON" family is yours for the asking. Write E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Dyes and Chemicals Division, Wilmington 98, Delaware.

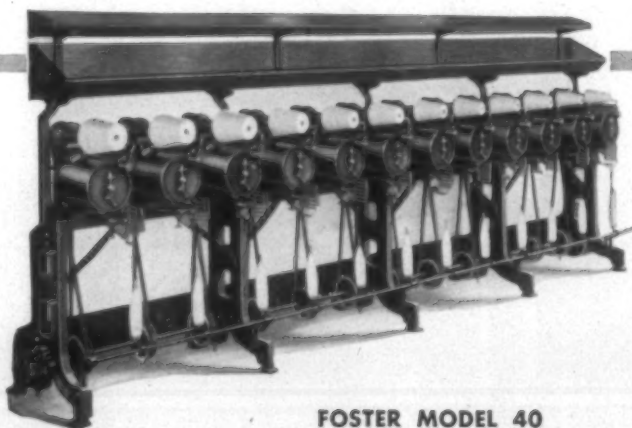


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FOSTER MODEL 40

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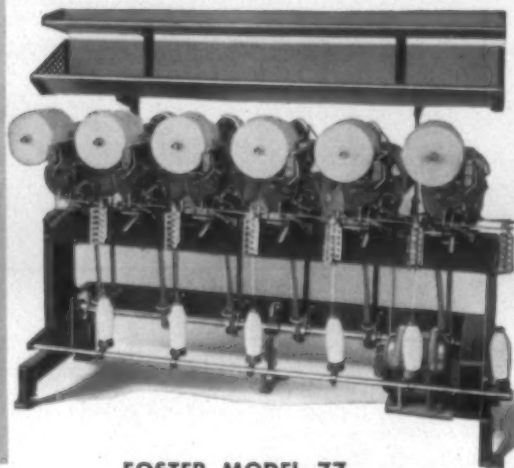
A champion in any endeavor, sporting or manufacturing, is made by superior ability in "give and take". The Foster Model 77 and Model 40 precise winders for cones and tubes are champions in this respect. They have proved, in tough competition, their ability to give high production and superior packages in the winding of coarse yarns and heavy plies. They are also known for their ability to "take it", requiring minimum mechanical maintenance and repair.

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FOSTER MODEL 77

Check these champion characteristics of Foster Model 77 and Model 40:

1. Precise wind or lay.
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3. Spindles driven by individual quarter-turn belts.
4. Equipment for drawing either over-end or unrolling.
5. Arbors for various types of cones and tubes furnished for both machines.
6. Traverses on Model 77 up to 8"—on Model 40 up to 6½".
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8. Model 77 winds a range of counts from 8/3 to 8/100; Model 40 from 30/2 to 8/40.



# Southern DURAWOOD Shuttles

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HERE IS THE SHUTTLE YOU HAVE BEEN LOOKING FOR IN YOUR NEVER-ENDING JOB TO OBTAIN LOWEST COSTS PER LOOM HOUR. FOR A VERY MODEST EXTRA OVER PLAIN WOOD SHUTTLES YOU GET AMAZING INCREASE IN SHUTTLE LIFE.

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- ✓ negligible weight increase, requiring no major loom adjustments to start the shuttle;
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Durawood shuttles are highly recommended for cottons, spuns, woolens and worsteds.

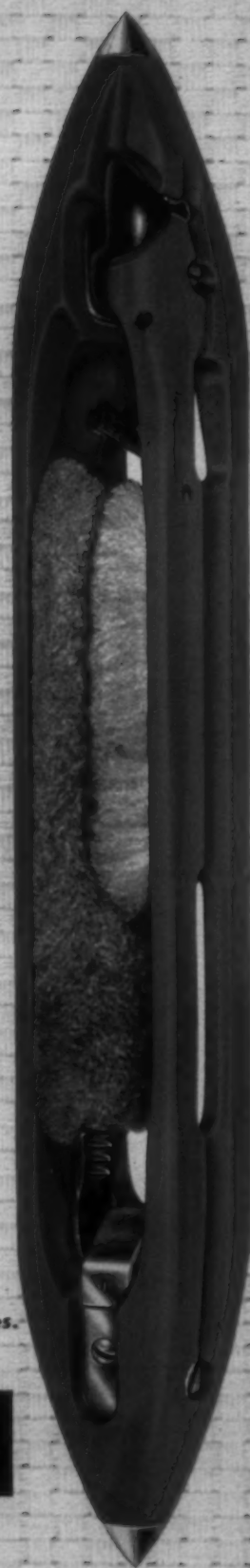
Make your next shuttle order "Southern Durawood" and you, too, will soon be counting your savings.

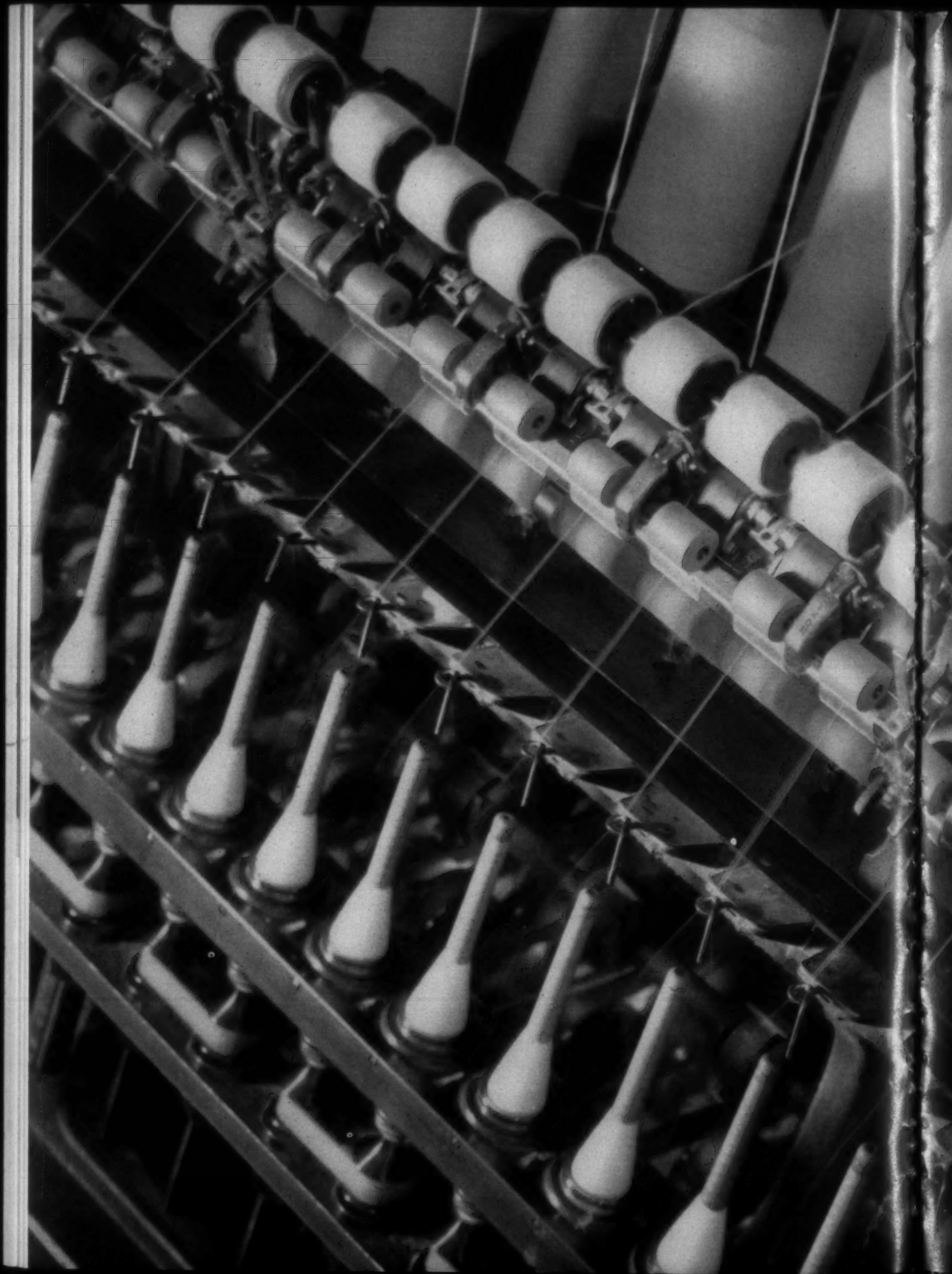
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For example, hundreds of mills have reduced front roll laps to a minimum by using J-490 Cots. J-490 Cots have a special built-in electrolyte that actually tends to repel loose ends.

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When considering any change in roll covering, it's a good idea to talk things over with your Armstrong man. His practical training and experience can be of help in choosing the right roll cover for best performance in your spinning room. Armstrong Cork Company, Industrial Division, 6510 Davis Avenue, Lancaster, Pennsylvania.

**Armstrong ACCOTEX COTS**

*... used wherever performance counts*

For more details on Accotex Roll Covers, or other Armstrong textile supplies, write for the booklet, "Armstrong Textile Products." It can help in selection and maintenance of Armstrong spinning and weave room supplies.



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As Chicopee has grown, progressed and modernized, it has relied predominantly on Amco to satisfy each of its air conditioning needs with the system best suited for each particular process.

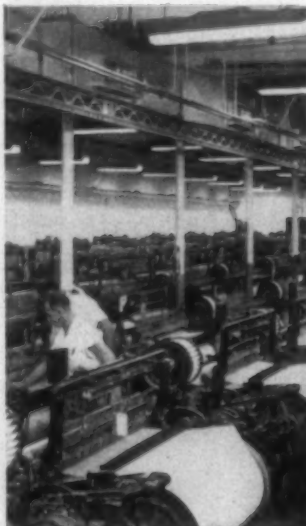


1927



In 1927, Chicopee humidified its Gainesville Cotton Mills with Amco Duplex Humidifiers — high-duty, spray type humidifier with motor-driven fans.

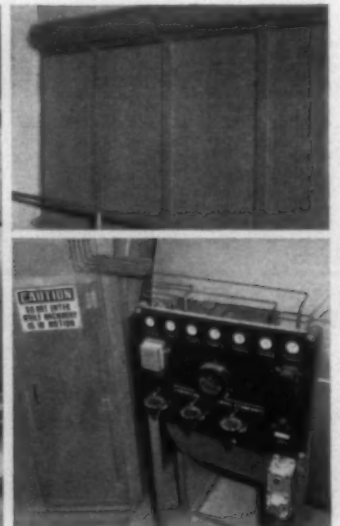
1957



In 1957, 30 years later, an Amco Dry Duct system was installed in a weave room addition at Walhalla, S.C.



As recently as 1955, Chicopee installed Amco Central Station systems in its Bensenville, Illinois and Milltown, New Jersey plants, where the famous Masslin Non-Woven Fabrics are produced.



## Amco systems installed in Chicopee plants from 1927 to 1957



Chicopee Falls, Mass.



Bensenville, Ill.



Walhalla, S. C.



Manchester, N. H.



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Bensenville, Ill.; Chicopee Falls, Mass.; Gainesville, Ga.; Manchester, N. H.; Milltown, N. J.

### Evaporative Cooling

Chicopee Falls, Mass.; Manchester, N. H.; Walhalla, S. C.

### Dry Duct

Walhalla, S. C.

### Central Station with Air Washers

Bensenville, Ill.; Milltown, N. J.

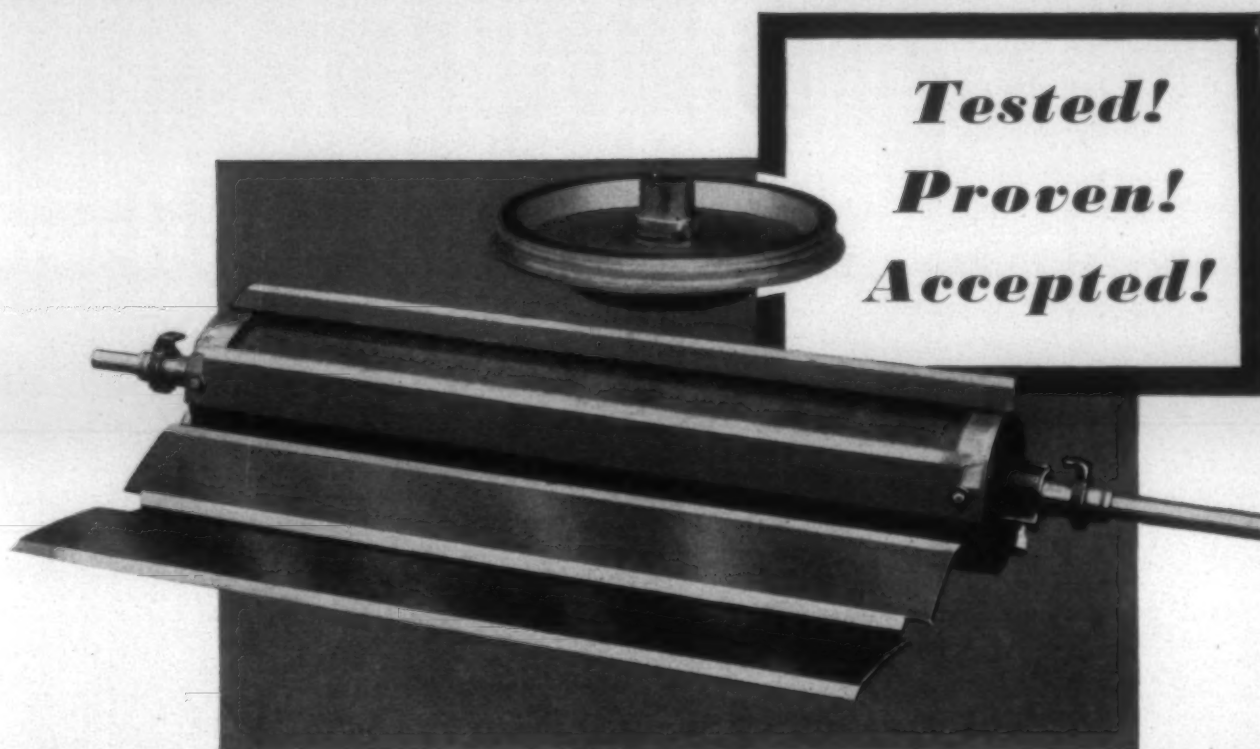
Whether your need is for one room or an entire mill, Amco offers air conditioning to meet your requirements. Amco designs and installs all types of systems — humidification; humidification in combination with cooling, as in the ductless evaporative cooling system; unit dry-duct systems; central station systems, with or without refrigeration.

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# WATCHING

# WASHINGTON

[Exclusive and Timely News from the Nation's Capital]

Strong opposition has developed to the proposal before the House Ways and Means Committee to bring this country into the Organization for Trade Co-Operation at Geneva. It is called a back door to G.A.T.T., and would firmly bind this country to tariff and quota policies made by the group. The Administration is pressing for favorable action. It will come up in relation to the expiration of the Reciprocal Trades Agreement Act, and its renewal.

Reasons for seeking defeat of the proposal to join O.T.C. is that it would shift total control over foreign trade policy to the State Department, and lodge tariff decisions overseas. The constitutional function to regulate foreign commerce, as a right of self rule, would be surrendered in effect. Since enactment of the Escape Clause in 1951, the President has rejected recommendations of the Tariff Commission in a great majority of cases, thus nullifying the intent of Congress that no worthy domestic industry would be jeopardized.

The Administration wants a tax cut next year, even in the face of its higher spending, and of a budget that will be higher. But it cannot quite figure out where to make it, or how much. There is good chance Congress will vote a cut, whether the Administration approves or not. Revised estimates of the new budget put the sum at \$72 billion; higher than last year. Generally, legislators consider this too much, or if spending is to be increased over last year they want to decide where and how much.

A mid-year review of spending "clearly indicates that last Spring's budget reductions will result in virtually no reductions in spending this year," said Senator Byrd. "Obviously, the President is using unexpended balances to keep spending at the high level he estimated in January, or higher. This is contrary to the intent of Congress, and clearly shows Congress has lost control over spending. The failure to reduce spending reduces possibility of any worthwhile tax reduction in the next session."

A chairman of the powerful Senate Finance Committee, Senator Byrd said he would continue opposition to raising the present debt limit. Indication is that a request will be made to raise the \$275 billion ceiling as soon as Congress convenes. Senator Byrd said "Our economy cannot remain strong over a long period with Federal spending of \$72 billion or more. Excessive spending is a factor in current inflation, which is perhaps the nation's most serious menace."

The McClellan Committee has abundant evidence that a vast part of union members have no voice in their unions, and no knowledge of how its affairs are handled. Some members even fear to attend union meetings, and it is often worth a man's job to raise a question as to an act of an arrogant union boss. If thrown out of the union, a union member generally cannot get a job. The strange hold of most unions on their members is absolute, with even court relief seldom possible.

Coming up in the next session of Congress is Senator Lausche's Right-To-Work proposal, prohibiting compulsory membership in any union. Lausche is only one of the self-acclaimed "friends" of labor to stand up and propose a national Right-To-Work law. But many professed "friends" in Congress have stood silent



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"IF IT'S PAPER"

1957

in the face of the mountain of evidence before the McClellan Committee that compulsory membership is the primary means by which union bosses establish and maintain their grip on the economic life of industrial workers, and rule the unions from the top down.

One item brought out by the McClellan Committee is that the teamsters paid out \$170,000 to defend men charged with extortion. Witnesses told the committee that extortionists were kept on the payroll of the teamsters' joint council in Detroit while serving jail terms. Other witnesses told of fighting to remove corrupt leaders, and then being discharged by employers for unassigned reasons.

How Congress will react to the election of Hoffa to head the teamsters remains to be seen, with much doubt as to the final action. President Meany wants to protect unions from any sharp or barbed legislation. Influence of unionists is strong in the House Labor Committee, and any bill to require unions to "clean up" may either not emerge, or come out so diluted as to be ineffectual.

Virtually certain, however, is that all union officials will mass together to oppose any new legislation that is deemed effective in checking abuses. The terms "restrictive" and "anti-labor" will be freely used, as was the term "slave labor law." Union bosses say now the only law needed is one to deal with welfare funds and allow the Secretary of Labor to make union financial reports public. They are opposed to any bill to put control of unions in the hands of members.

Five areas in which new labor laws are needed have been defined by Senator Mundt (R., S. D.) of the McClellan Committee. The areas are: (1) insure that union funds are spent only for the purpose collected; (2) return control of unions to members, and strengthen their "democratic procedures"; (3) protect unions and citizens against criminal elements gaining control of unions; (4) protect workers against compulsory collection of money for political purposes; and (5) outlaw the secondary boycott.

The President's prolonged vacations and excessive golf playing during tragic hours has not escaped the notice of members of Congress who remain in Washington. Belief is expressed by some top leaders in Congress that only one short step remains to setting up a military oligarchy, at least in the South.

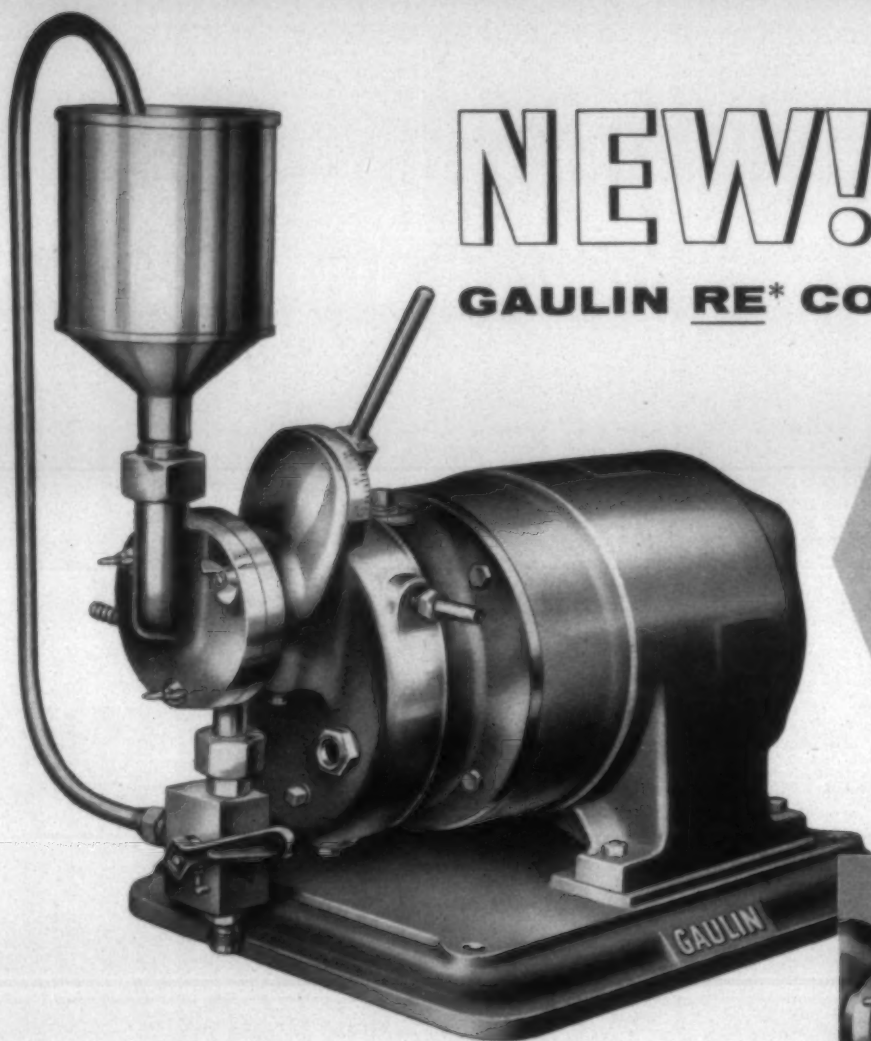
Republican leaders outside of the Administration are disturbed by nationwide reports of reaction to the Little Rock incident. Intended by political strategists to win Negro votes, it appears, even in states along the Canadian border, to be driving away many times more white votes than it is winning Negro votes. In the big Negro-crowded cities of Chicago, Cleveland and Philadelphia, the reaction among whites is startling. Some observers say it may be known in the future as the most amazing piece of political stupidity on record.

Senator Ervin (D., N. C.) said the President's "tragic action is illegality run riot"; not abstract illegality, but "illegality enforced at the point of a bayonet." He cited questions asked the Attorney General when the civil rights bill was in the Senate committee as to possible use of troops to enforce Federal court orders. He said Mr. Brownell remarked he was disturbed by these questions even being raised, and that he did not know of any statement having been made anywhere that would even lead to such an inference.

The full force of Southern civil rights cases will begin to strike the Supreme court in the new term that started October 7. Of 500 pending cases, eight relate to civil rights and two to school integration. One of the latter relates to Virginia's controversial pupil placement plan, and is an appeal from the trial court in Norfolk. Other cases now pending in state supreme courts, including the integration suit of Fairfax County, Va., are expected to reach the high court before the terms ends.

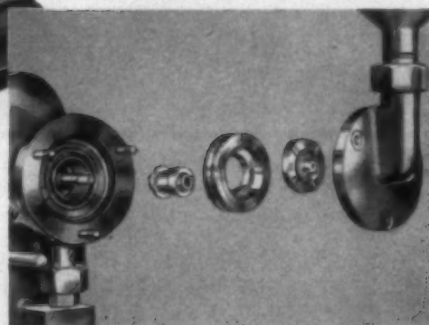
# NEW!

## GAULIN RE\* COLLOID MILL

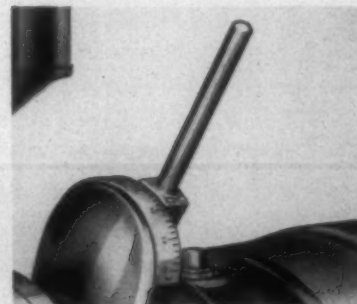


This is the Model 2A. It is shown with accessory equipment — stainless steel 3-way valve, by-pass tubing and tank — for processing quantities as small as 8 oz. Extremely useful for laboratory and research work, it is also designed for production work within its capacity range. Mill body is water jacketed for either heating or cooling.

### The Special PLUS Features of the Gaulin RE\*



Exclusive! Removable rotor, stator and shaft seal can be disassembled without tools. Shaft leakage is eliminated — There is positive sealing even when processing volatile organic liquids.



Special micrometer adjustment — from  $-.001$  to  $.040$  — accurately positions the gap opening between rotor and stator. Adjustment of opening can be made at any time whether machine is running or not — allowing continuous control of processing operation.

Here's a brand new concept in Colloid Mills — the Gaulin RE\* with removable rotor, stator and shaft seal. The horizontal two-stage design gives maximum capacity per horsepower and unusual processing efficiency. Result: The Gaulin RE\* Colloid Mill greatly simplifies operation, can be cleaned without tools, has minimum maintenance, positive shaft sealing and greater production per dollar invested.

### Special Materials Available

Rotor and stator can be furnished in stainless steel, tungsten carbide, ceramic, alundum and other special materials. Removable feature makes parts interchangeable.

### Wide Range of Capacities

The Gaulin RE\* has a capacity range from 0-2600 gph. Model 2A: 0-310 gph; Model 4A: 0-1000 gph; and Model 8A: 0-2,600 — all depending on product, specifications and gap setting.

### Send for New Bulletin

Put this new Colloid Mill to work for you! Complete data on the RE\* line is available in a special bulletin. Construction details, capacity data for typical products, and rating curves are included. Ask for C-56 from: The Manton-Gaulin Mfg. Co., Inc., 66 Garden Street, Everett 49, Mass.



\*patent applied for



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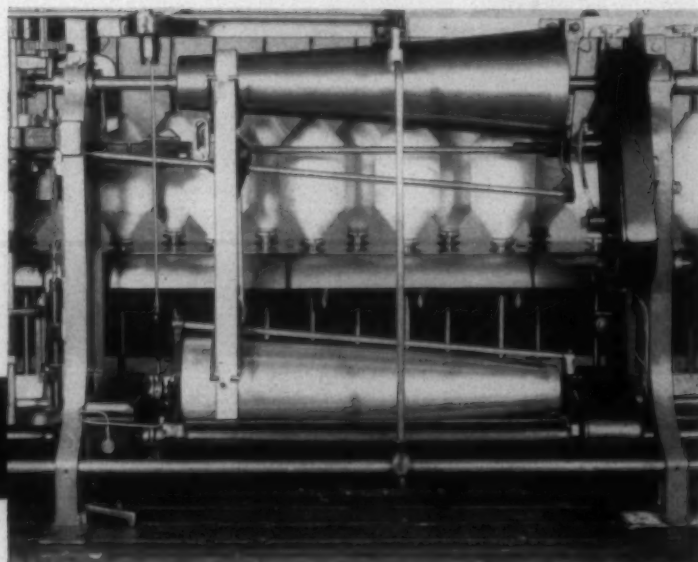
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The new Flyer is strong enough to make a 12" x 7" package on standard 12" x 6" roving frames without decreasing speed or changing other standard parts. It will run without distortion at speeds up to 735 rpm. In many cases, this new flyer permits the building of a bobbin holding 60 to 62 ounces of roving, which amounts to a 37% increase in bobbin capacity. The cost of equipping standard roving frames with these new 12" x 7" flyers is so reasonable that they pay for themselves in a comparatively short period of time.

#### Jumbo Cone

The need for additional power to drive long, large package roving frames has been solved by Saco-Lowell engineers increasing cone speed 33% and cone size 50%. The new Jumbo Cone assembly provides a driving element with sufficient power capacity to drive these frames at a very high percentage of efficiency. The new aluminum bottom cone which is also included in the assembly reduces belt slippage to a minimum.



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TEXTILE BULLETIN is devoted to the dissemination of information and the exchange of opinion relative to the spinning and weaving phases of the textile industry, as well as the dyeing and finishing of yarns and woven fabrics. Appropriate material, technical and otherwise, is solicited and paid for at regular rates. Opinions expressed by contributors are theirs and not necessarily those of the editors and publishers. ¶ Circulation rates are: one year payable

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## The Union Pot Is Boiling

The election of James Hoffa as international president of the teamsters union is expected to touch off more union squabbling than this country has ever known. How far it will go and in what shape it will leave organized labor is anybody's guess, but certainly the ship has hit the sand.

Delegates to the teamsters convention obviously knew what course they were taking when they named Hoffa to lead them. They had been warned by the A.F.L.-C.I.O. high command that they would be courting expulsion from the parent union if they supported Hoffa's bid to succeed Dave Beck. And even while they were in convention Senator McClellan (D., Ark.) was re-emphasizing what his Senate Rackets Committee thought of Hoffa, which wasn't anything good. But neither of these pressures were of sufficient force to derail the Hoffa express.

To most observers on the labor scene, Hoffa's election was not so much a surprise as it was a puzzle. It wasn't a surprise because, after all, the delegates casting votes for Hoffa were casting votes for the Boss. On the other hand, it was difficult to understand why Hoffa would have the teamsters bucking everybody in sight solely for Hoffa's benefit. The only conclusion seems to be that the teamster high command is not at all reluctant to doing battle with the A.F.L.-C.I.O. regardless of what the effect will be on organized labor in general.

One thing to be expected as a result of Hoffa's election is the enactment of legislation in the next session of Congress directed at racketeering by union bosses and at the monopoly of union labor. The revelations of The Senate Rackets Committee have had much to do with increasing Congressional sentiment toward such legislation. Many members of Congress are coming to believe that unions should be placed under the anti-trust laws, the same as business. It is becoming more and more recognized that the power of an organization such as the teamsters union to

paralyze a plant or an entire industry by mere refusal to work must be curbed. The Justice, Labor and Commerce Departments have been studying this subject for months and may be in position to offer recommendations by the time Congress reconvenes.

Another step Congress might take would be the adoption of a Federal right-to-work law. Such legislation is already on the books in 18 states, and, according to a recent poll taken by the American Institute of Public Opinion, 63 per cent of the general public approached on the subject said they would vote for right-to-work laws if the question was ever put to a referendum. If a Federal right-to-work law were to be passed by Congress, it would probably be modeled after the state statutes, most of which consist of two simple provisions—first, that no person shall be denied employment because of membership or non-membership in a labor organization; and, second, that any agreement or understanding which conditions the right-to-work in any occupation upon membership or non-membership in a labor organization is illegal and void.

Congressional sentiment is also said to favor legislation which would prohibit the expenditure of union funds for political candidates. Dues paid by Democratic union members should not be used to elect Republicans to public office, and vice-versa. Any use of union funds which would put union bosses in a position to dominate officeholders is, of course, contrary to the public interest.

Robert F. Kennedy, counsel for Sen. McClellan's investigating committee, lists at least seven areas in which there is a definite need for Federal action: (1) misuse of pension and welfare funds; (2) misuse of union funds; (3) misuse of trusteeships; (4) lack of democratic procedures; (5) use of violence and terrorism; (6) use of boycotts; and (7) use of members' dues for political purposes.

Organized labor will fight any proposed legislation, even measures much milder than the foregoing, with the usual arguments that such laws are deprivations of the working

man's freedom to organize for the purpose of protecting the rights guaranteed to him by the Constitution. The election of Hoffa to head the teamsters union merely weakens this argument.

## A Four Day Week

In an address before the Charlotte Textile Club on Monday, October 14, F. E. Grier, president of Abney Mills and chairman of the board of Erwin Mills, discussed a number of important issues currently before the textile industry. He reported on last month's International Conference of the Cotton and Allied Textile Industries which he attended in Venice, Italy. He discussed our relationship with the Japanese; spoke of the desirability of research and sales promotion; and voiced the hope that a long-range common sense plan for cotton might come out of the next Congress.

All of these are important issues, he pointed out, "and the successful working out of these things will be most healthy for our industry. But what we need and need badly is the prompt correction of the economic nightmare that is facing us right now—*poor earnings* or perhaps *no earnings at all*."

This economic nightmare, he continued, is the result, of course, of the industry's over production. "Most of our greige mills," he pointed out, "are today carrying excess inventory. Our goods are priced for quick deliveries at prices as low or lower than for future sales. There is no incentive for our customers to buy ahead. Many mills which have been on a six-day schedule have gone back to five days. This, however, good as it may be, is too little and too late.

**"What our industry needs is a running schedule of four days a week for about six weeks and five days thereafter for 12 months, and a positive announcement made by individual mills in all the trade papers committing ourselves to this schedule.**

"It would not be possible to estimate in dollars and

cents how much this would mean to our industry. But I can tell you this—it would mean the difference between bad times and good times, between a poor market and a strong market, between a burdensome inventory and a healthy cash figure on the balance sheet.

"We would all adopt this program at once if we could be assured that our competitors would do likewise. This assurance, within the law, is not possible. But some months ago a large producer of synthetics announced a curtailed operating schedule for the year 1957. It was a courageous move, and the mill which made it deserves a vote of thanks. The market for the synthetics which that mill manufactures is much improved.

"I hope that the day is at hand when the mills in this section and in my section in South Carolina and all over this nation will have the wisdom and the courage to follow the course based on sound business judgment and not based on the course which we think our competitors will follow."

At this writing it is too early to gauge industry reaction to Mr. Grier's proposal, but the proposal itself again emphasizes the structural difference that exists between the textile industry and such other basic industries as steel, automobiles and coal. That difference, as has been cited many times, is the fact that the textile industry is an industry of small businesses. No one corporation is large enough to set a pattern for the industry to follow.

As pointed out by Mr. Grier, the adoption of a four-day week for six weeks followed by a five-day week for 12 months would have to be a voluntary action entered into by the individual mills on their own hook. There would have to be assurances without formal agreements. Most of all, and this has been the big hurdle down through the years, the individual mills would have to have the determination to follow that course based on the soundest business judgment—not based on the course expected to be taken by the competitor. When the textile industry can do that, it will, as Mr. Grier said, "have become a grown-up industry economically. We will have put away childish things . . . and a new light will shine for our industry."

### TEXTILE INDUSTRY SCHEDULE

#### — 1957 —

Oct. 26 (Sa)—Fall meeting, EASTERN CAROLINA DIVISION, SOUTHERN TEXTILE ASSOCIATION, School of Textiles, N. C. State College, Raleigh, N. C.

Nov. 9 (Sa)—Fall meeting, SOUTH CAROLINA DIVISION, SOUTHERN TEXTILE ASSOCIATION, School of Textiles, Clemson College, Clemson, S. C.

Nov. 14-15 (Th-F)—Annual conference on Electrical Applications for the Textile Industry (sponsored by the Textile Industry Subcommittee and the General Applications Committee of the AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS), North Carolina State College, Raleigh.

Nov. 14-16 (Th-Sa)—National convention, AMERICAN ASSN. of TEXTILE CHEMISTS & COLORISTS, Hotel Statler, Boston, Mass.

Dec. 7 (Sa)—SOUTHEASTERN SEC., A.A.T.C.C., Dinkler Plaza Hotel, Atlanta, Ga.

#### — 1958 —

Jan. 27-28 (M-Tu)—Annual meeting, NATIONAL COTTON COUNCIL OF AMERICA, Phoenix, Ariz.

\*Jan. 30-Feb. 1 (Th-Sa)—Annual conference, TEXTILE DIVISION, AMERICAN SOCIETY FOR QUALITY CONTROL, Clemson House, Clemson, S. C.

Mar. 18-21 (Tu-F)—Spring meeting, COMMITTEE D-13 ON TEXTILE MATERIALS, A.S.T.M., Sheraton Park Hotel, Washington, D. C.

Feb. 12-14 (W-F)—COTTON RESEARCH CLINIC (sponsored by the National Cotton Council), The Carolina, Pinehurst, N. C.

Mar. 6-7 (Th-F)—Spring meeting, TEXTILE QUALITY CONTROL ASSOCIATION, Poinsett Hotel, Greenville, S. C.

Apr. 10-12 (Th-Sa)—Annual convention, AMERICAN COTTON MFRS. INSTITUTE, Hollywood Beach Hotel, Hollywood, Fla.

\*Apr. 16-18 (W-F)—Annual meeting, ALABAMA TEXTILE MANUFACTURERS ASSOCIATION, Hotel Buena Vista, Biloxi, Miss.

\*Apr. 23-26 (W-Sa)—Annual meeting, COTTON MANUFACTURERS ASSOCIATION OF GEORGIA, Boca Raton Hotel, Boca Raton, Fla.

Apr. 24-26 (Th-Sa)—Annual convention, PHI PSI TEXTILE FRATERNITY, Philadelphia, Pa.

Apr. 30-May 1 (W-Th)—Spring meeting, THE FIBER SOCIETY, The Clemson House, Clemson, S. C.

May 19-24 (M-Sa)—NATIONAL COTTON WEEK, sponsored by the National Cotton Council of America.

May 26-29 (M-Th)—NATIONAL PACKAGING CONFERENCE AND EXPOSITION (sponsored by American Management Assn.), New York Coliseum, New York City.

June 19-21 (Th-Sa)—Annual convention, SOUTHERN TEXTILE ASSN., The Grove Park, Asheville, N. C.

June 22-27 (Su-F)—61st annual meeting, AMERICAN SOCIETY FOR TESTING MATERIALS, Hotel Statler, Boston, Mass.

\*Sept. 18-20 (F-Sa)—Fall meeting, TEXTILE QUALITY CONTROL ASSOCIATION, Hotel Barringer, Charlotte, N. C.

(M) Monday; (Tu) Tuesday; (W) Wednesday; (Th) Thursday; (F) Friday; (Sa) Saturday

\*Listed for the first time this month.

‡Tentative listing.

†Changed or corrected from previous issue.

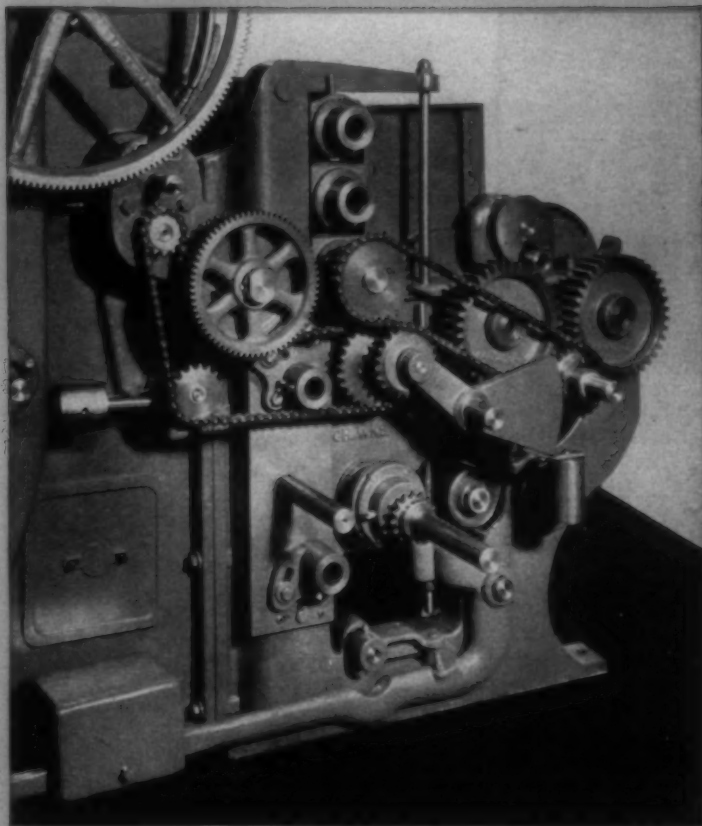
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PICKERS!**

● The chain drive to the draw-rolls and screens permits better draft control between the screens and the draw-rolls and the draw-rolls and the calender rolls. The old gearing was rather inflexible. The new chain drive is very flexible, and can give much smaller increments of change than were possible with the old drive.



The chain drive to the fluted calender rolls is also highly flexible and permits very accurate maintenance of the desired draft between the vertical rolls and the fluted rolls so that any slack can be kept out of the lap, and firmer more compact laps wound on the lap pin.

This chain drive to the fluted rolls stops those rolls while the picker is being doffed. This prevents injury to the lap by unnecessarily turning it while no cotton is being added. The lap is broken on top of the back fluted calender roll, and remains threaded up under the press roll. This eliminates the heavy place in the lap usually found next to the pin, and it also speeds up the doffing time, because the lap is only two inches from the pin when the picker is started.

**Aldrich Machine  
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Greenwood, South Carolina

# For the Textile Industry's Use

## — NEW MACHINERY, EQUIPMENT AND SUPPLIES —

### Frame, Room Cleaner

The Bahnson Co. is introducing an advanced new approach to mill cleaning problems in its Cross-Jet cleaner model. Three functions—frame cleaning, room cleaning and self-cleaning—are combined in one compactly designed, self-propelled unit. A reduced number of parts means that less maintenance is required. By combining in one unit 3 cleaning functions for multiple critical areas within the mill, over-all cleaning costs are reduced. Cross-Jet's balanced design allows high speed track performance to cover a larger area faster for thorough cleaning of more frames.

The new model is ruggedly constructed and offers fixed and rotating air jets. Four rotating nozzles clean the entire creel section of a frame, room walls, ceilings, columns and fixtures, in addition to the clean-

er itself. Two fixed, flexible nozzle extensions with multiple orifices clean all levels of the frame itself, with close direct air blasts to each side. The frame-mounted track construction, with shielded electric conductors, is one of the strongest ever developed for the textile industry.

(Request Item No. J-1)

### Fabulized Finish

Fabulized, a new finish which gives synthetic fabrics and blends the absorbency of cotton and the softness of silk, has been introduced by Fabulized Inc. Fabulized is said to represent a new profit potential for synthetic textile mills. As tested by an independent testing company, the finish gives synthetics approximately 4 times the ab-

sorbency of regular-finished synthetic fabrics, thus eliminating perspiration clamminess and the hot, clinging, uncomfortable feeling associated with wearing clothing made of synthetic fabrics and blends. There is reportedly nothing in the field that gives synthetics such natural fiber absorbency as Fabulized does. The company predicts that the finish will do for synthetic textile sales what Sanforized did for the cotton industry.

The test method used on this product by an independent testing agency consisted of dropping swatches of Fabulized and regular-finished fabric from the height of 1 inch into a tray of water at room temperature. In 33.5 seconds (average) the Fabulized swatch was completely saturated. At the end of one hour period, the non-Fabulized swatch was still floating on the surface of the water.

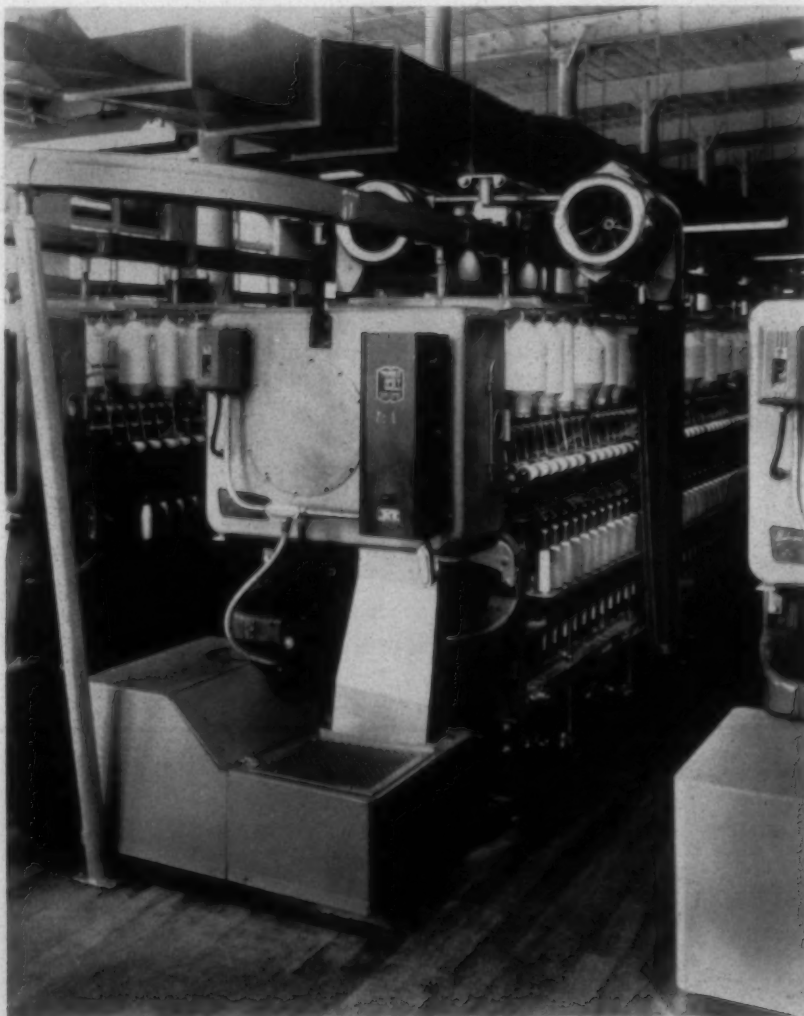
The process needs no special mill equipment for application and costs no more to apply than standard type finishes. A national advertising and public relations campaign covering the consumer and trade market will introduce and promote Fabulized. The finish is being marketed on a licensee basis. (Request Item No. J-2)

### Controllable Color Stripper

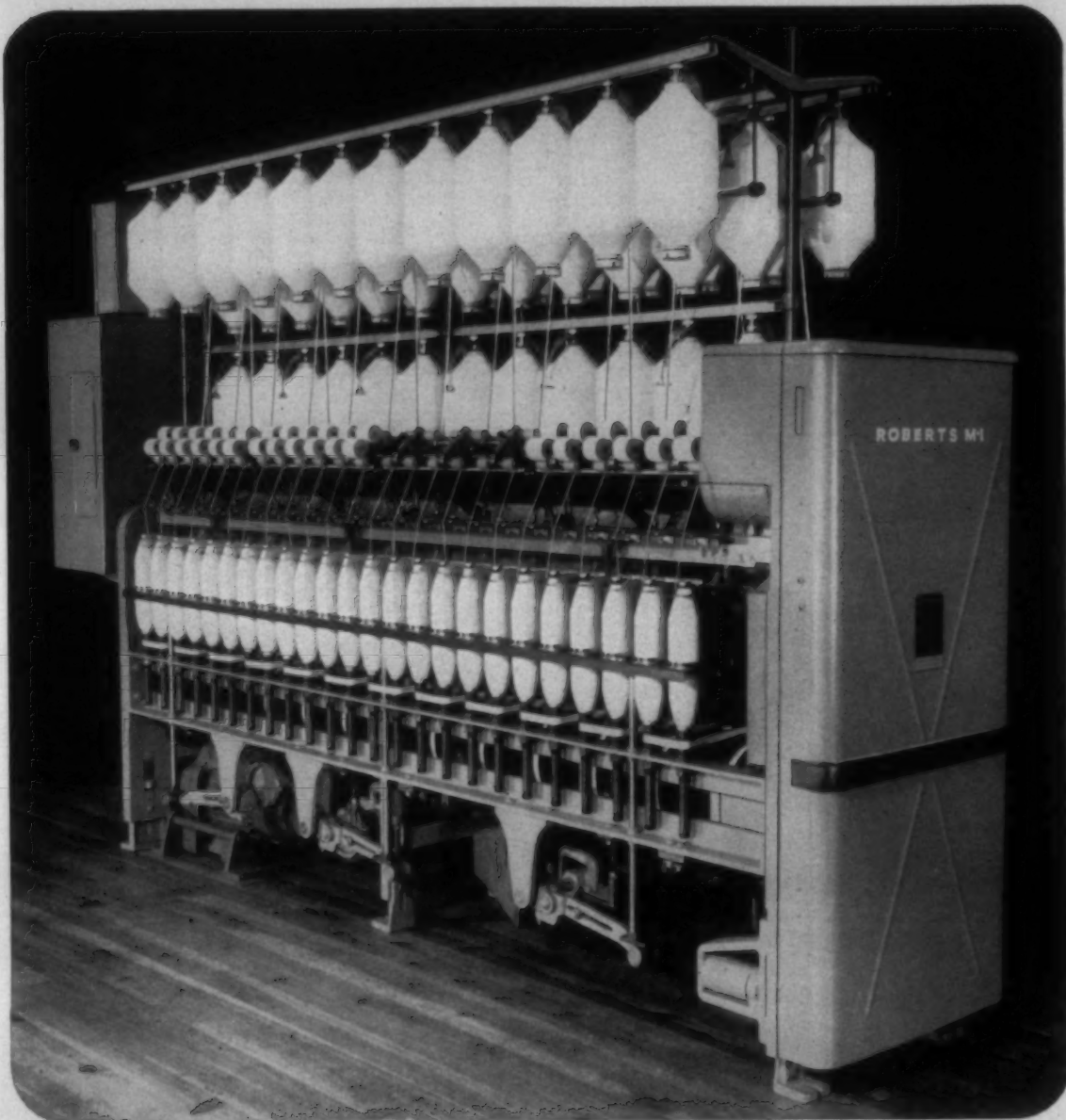
A liquid titanium preparation for controlled stripping of reducible dyes is now available to the textile industry from the A. L. Wilson Chemical Co. Called Wilstrip, the product comes in highly concentrated form for mixing in a solution with ordinary tap water. Its effectiveness and speed are said to be controlled by varying the strength of the solution and applying heat. It may be used cold for slow-action stripping or hot for faster results. Wilstrip also can be used to remove an unwanted color from another without injuring the base color. Widely used in the textile maintenance field, Wilstrip is said to have no effect on tensile strength and is suitable for use on cotton, linen, silk, wool and synthetic fabrics. (Request Item No. J-3)

### Bobbin Holder

A new bobbin holder for spinning frame creels has been developed by James Hunter Inc. which will support all bobbins from 8x4 to 12x7, inclusive. The unique design of the positive type holder eliminates tripping and latching devices, and permits closure of the top of the holder to prevent lint accumulation. The holder contains only 2 actuating parts— independently retractable holding fingers, which are spring-loaded, to center the roving bobbin and let off the roving concentrically. The



Cross-Jet cleaner (The Bahnson Co.)



# ROBERTS SPINNING

## ALL NEW—ALL BALL BEARING ROBERTS M-1 SPINNING FRAME

### MODERN IN DESIGN

Into the rugged simplicity of the Roberts M-1 chassis has been built all the ball bearing features needed to provide the smooth operation and productivity for today's and tomorrow's production goals. Standard features include:

- BALL BEARING TOP ROLL SUSPENSION
- BALLOON CONTROL ARRANGEMENT
- BUILT-IN UnitVac SUCTION CLEANING
- EXTRA CAPACITY SPINDLES
- FULL BALL BEARING HEAD
- UMBRELLA CREEL
- 45 DEGREE ROLL STANDS
- STEEL BASE RAILS, ROLL BEAMS, RING RAILS
- ADJUSTABLE DRAFT CONSTANT, 500 TO 3000
- TURNKEY ERECTION AND STARTUP

### PROVEN IN PERFORMANCE

New Roberts Spinning has been running in the mill since February 1956 and has proven itself not only most economical in initial cost but low in maintenance. One large user with more than 150 frames in continuous production reports that the new Roberts Spinning runs with higher front roll speeds, better yarn quality and substantially lower ends down than the several thousand frames of other makes in operation in their mills.

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## FOR THE TEXTILE INDUSTRY'S USE—

holding fingers have been designed to exert a greater hold as the weight of the bobbin is increased; and it is impossible for a bobbin to become disengaged accidentally, the company points out.

The bobbin holder is mounted on 2 hardened steel races with 8 chrome alloy steel balls. A convex dust shield deflects air currents downward, causing lint and dirt to be carried away from the bearing. The entire unit is corrosion-resistant, and covered with a dust cap in which there are 2 holes to support the brake. The brake can be added anytime without removing the bobbin holder from the creel. The bobbin holder can be adapted to all makes or models of creels, including wooden strip creels. It can be dismantled easily, for repair or parts replacement.

(Request Item No. J-4)

## Tru-Tension Let-Off

The Draper Corp. has announced the development of the Tru-Tension let-off designed to give a constant rate of yarn delivery to the loom while maintaining constant tension on the warp yarns. To accomplish this, Draper points out, the Tru-Tension let-off has been provided with these two required features: (1) a positive and continuous drive; and (2) a compensating friction transmission or drive adjusting device to provide automatic control of let-off speed and yarn tension from full to empty beam.

In announcing the new let-off, Draper points out that whereas the No. 4 automatic Bartlett let-off, driven from the sword, gives an intermittent let-off action, the Tru-Tension let-off is driven by means of sprockets and a roller chain from the crank shaft. Changing the number of teeth in either or both of the driving sprockets

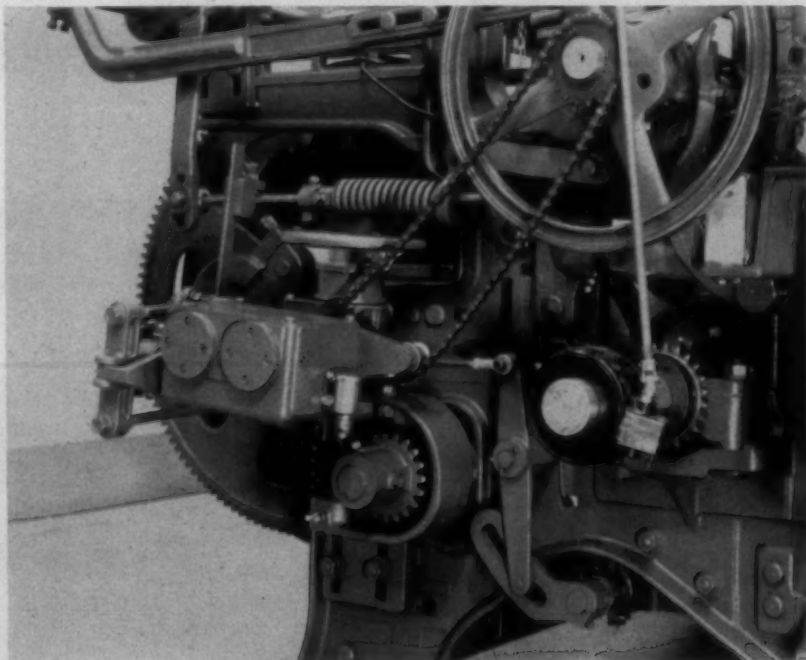
provides a wide pick range. For example, by changing sprockets, a pick range of from 17 to 106 p.p.i. can be obtained by a 26-inch beam; from 17 to 125 p.p.i. with a 22-inch beam.

Constant warp yarn tension and delivery to the loom is said to be accomplished by means of a sensitive friction disc transmission interposed between the sprocket drive and the yarn beam. This transmission consists, essentially, of three series of discs, all of which are hardened, precision ground and splined to their shafts, but free to move laterally on each shaft. The outer discs have flat, parallel faces and are fixed in position from front to back of the loom. The series of center discs have bevelled faces, being thicker at the center than at the edges. These center discs "float," or are free to move (along with their shaft) from front to back as required by either tension or yarn delivery controls. As the distances between centers of friction disc shafts vary, the point of frictional contact between driving discs is altered to vary the driving diameters through the series of discs, thereby correspondingly varying the output speed of the mechanism.

Control over this friction disc transmission from full to empty beam is effected by means of a conventional beam follower and linkage which gradually accelerates the let-off as the warp is run off.

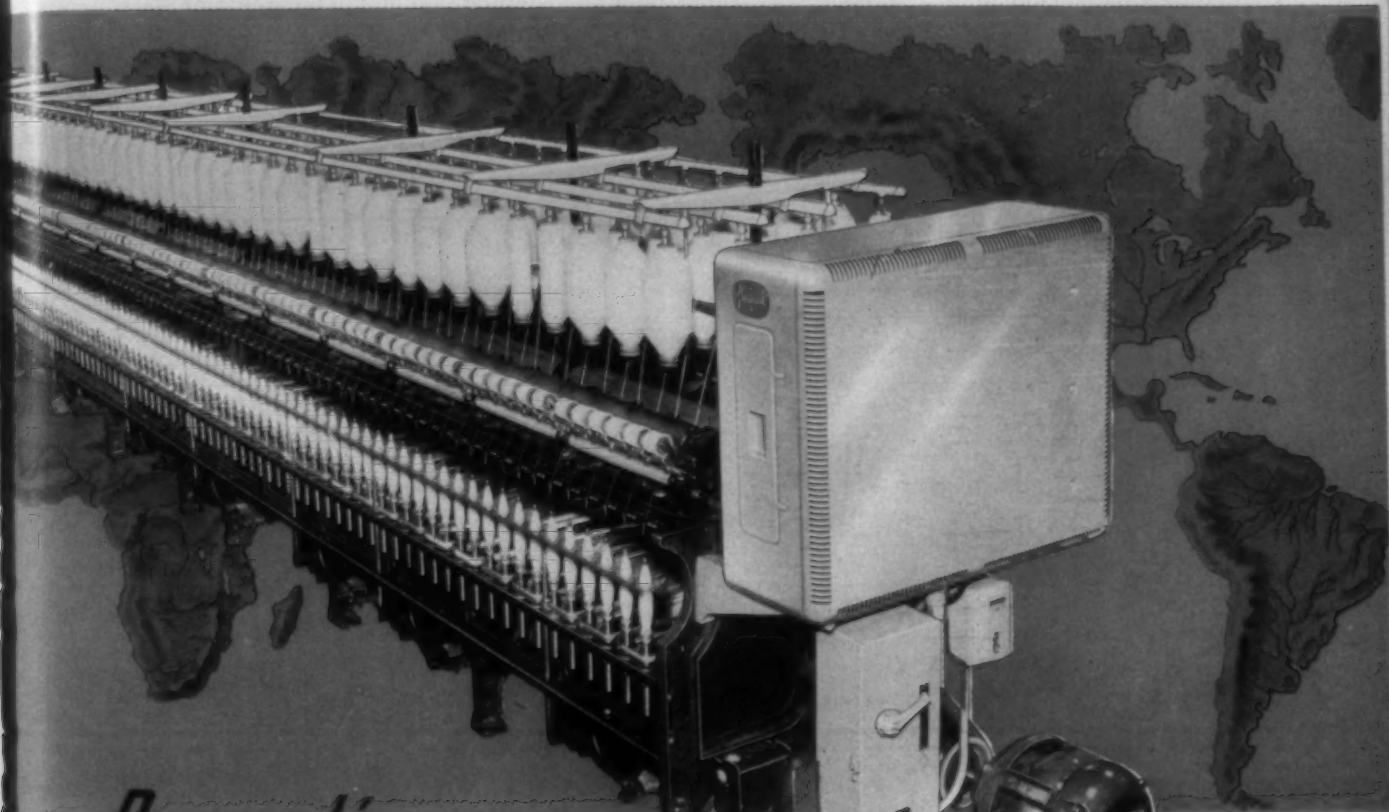
To keep a predetermined, constant tension on the warp yarns, the Tru-Tension let-off is further equipped with a micro-adjustment. This consists of a linkage arrangement between the whip roll and the frictional disc transmission. When the warp sheet becomes slack, the whip roll rises, and its motion is transmitted to the friction discs of the transmission to decelerate the let-off speed. A whip roll depressed by a tight warp will act automatically, through this linkage, to increase the speed of delivery of yarns.

A hand wheel permits disengaging of



Tru-Tension let-off (Draper Corp.)

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pattern filters out over 50% of  
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before it becomes slubs, assuring better yarn quality than ever before.

**LOWER SPINNING COSTS**—Larger spinning assignments are made possible with Pneumafil equipped frames because spinner hands have less ends to piece up, and hand cleaning is tremendously decreased.

*When you buy Pneumafil products, you can be sure of getting top value for your money!*

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Straps are tops  
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THE BULLARD CLARK COMPANY

## JACOBS

**SOUTHERN**  
DIVISION  
Charlotte, N. C.

**NORTHERN**  
DIVISION  
Danielson, Conn.

### FOR THE TEXTILE INDUSTRY'S USE—

the transmission and manual adjustment of the yarn beam when necessary. An adjusting knob provides for setting proper tension on yarn at the beginning of a new warp after which the Tru-Tension let-off should automatically control tension, within a few grams, until the warp has run out.

The Tru-Tension let-off has successfully eliminated uneven or wavy cloth on various critical weaves, Draper reports. It has proven to be particularly useful on synthetics and fine cottons.

All revolving elements of the let-off incorporate anti-friction bearings. All gears have cut teeth, and the discs of the frictional transmission run in an oil bath. The attachment is designed for long life with minimum maintenance requirements. The let-off is now available for X-2, XD and XP model looms. On looms presently having the No. 4 automatic Bartlett let-off, the new Tru-Tension let-off may be applied directly, using the old worm wheel shaft housing. For looms equipped with other let-offs, a new worm wheel shaft housing will be required.

(Request Item No. J-5)

### Ciba Dyestuff

A recent announcement by Ciba Co. Inc., introduced a new vat red dye of extraordinary fastness to weathering. Known as Cibanone Copper Red R Paste, the new dye has an attractive brick red shade that in many ways complements other fast reds in the Cibanone vat dye group. The dye's fastness to weathering is exceptional in its color range, while fastness to light, washing, bleaching, crocking and water spotting are characteristically high.

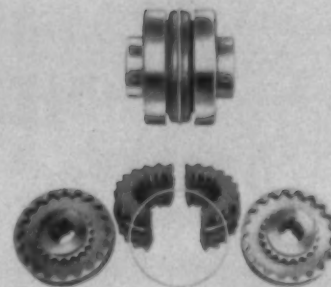
Flexible in application, the new color is applied by all regular exhaustion methods, including Williams unit, pad-steam and package dyeing procedures. The color has not been fully standardized for conventional printing but it gives good results in the flash-aging process of printing. Providing a clean shade at all practical dyeing depths, the new color builds well either as a self shade or in vat combinations yielding scarlets, tans, browns, etc., on both cotton and spun rayon fabrics.

The unique weathering fastness and soft pleasant tone of Cibanone Copper Red R Paste make it especially well suited for dyeing fabrics for deck and terrace furniture, awnings and coverings subject to rough wear and exposure and which must keep their fresh look through long usage.

(Request Item No. J-6)

### Cushioned Coupling

For use wherever mechanical power is to be transmitted, the new Sure-Flex flexible coupling, made by T. B. Wood's Sons Co., has only 3 basic parts: 2 hub flanges and a 2-piece rubber sleeve. The internal and external teeth of the flexible sleeve mate with the flange hub teeth and lock tight under torque load without clamps or screws. The elastic rubber sleeve with 2



Sure-Flex flexible coupling (T. B. Wood's Sons Co.)

planes of engagement absorbs both angular and parallel misalignment. There are no rubbing or wearing surfaces and hence no need for lubrication. All shock vibrations are absorbed and prevented from being transmitted by the coupling sleeve. This high torsional flexibility of approximately 15° at peak torque provides smooth power transmission.

Sure-Flex couplings are designed to tolerate, without wear, internal abuse or high resisting forces, angular misalignment of up to 1°, parallel misalignment of from  $\frac{1}{8}$  to  $\frac{1}{4}$ -in., depending on shaft size, and free end-float up to  $\frac{1}{8}$ -in., depending on size. Angular or parallel misalignment does not generate unbalance or pulsations since all flexing takes place within the rubber sleeve member. Shafts and bearings last longer because no destructive overhanging loads are imposed at any load through misalignment. Operation is noiseless.

Final assembly of the coupling can be made without tools of any kind. Shaft alignment is checked from the precision-machined flanges. Halves of the split rubber sleeve slip axially into place. A retaining ring may be added to hold the split sleeve for high-speed operation. Decoupling is as easy as assembly. Simply slide one hub flange along its shaft until the sleeve can be slipped out of the hub flanges. Shaft alignment does not need to be disturbed. There are no bolts to untighten and no covers, gaskets or seals to remove. The coupling is unaffected by abrasives, dust, dirt or moisture. There is no need to worry about the life of seals, guards or dust stops because none of these are used. The couplings are presently supplied in 6 sizes for motors from 3 to 80 h.p. Shaft bores are available from  $\frac{3}{8}$  to  $2\frac{1}{4}$  in.

(Request Item No. J-7)

### Plasticizer For Vinyls

A new low temperature plasticizer for vinyls, Plastolein 9078 LT Plasticizer, has been announced by the organic chemical sales department of Emery Industries Inc. According to the company, Plastolein 9078 is designed to meet the need for a low temperature plasticizer in the adipate price range. Compared to adipates, the new Emery product reportedly offers better low temperature flexibility as measured by both the Masland Impact and Clash-Berg tests.

Plastolein 9078 possesses higher efficiency and substantially greater compatibility than adipates. In addition, it imparts higher

tensile strengths at efficiency concentration, lower oil extraction and appreciably lower volatility. With this combination of low temperature flexibility, extended permanence and relatively low cost, Plastolein 9078 is said to be ideally suited for many uses, including vinyl sheeting and coated fabrics for outdoor upholstery and outerwear, extruded items and industrial tapes.

(Request Item No. J-8)

### Dock Bumper

The new, redesigned Kelco dock bumper manufactured by The Kelley Co. Inc. is molded of live rubber. Their shock absorbing and cushioning capacity is said to be far superior to wood, old tires or other makeshift arrangements. The dock bumpers are inexpensive, costing \$14 in lots up to 10. They are easily and permanently mounted on any new or existing loading dock.

(Request Item No. J-9)

### Sandoz Dyestuffs

Extraordinarily good fastness for a bright blue direct dye, plus outstanding money value among all the bright greenish blues, are cited by Sandoz Inc. as a major advantage of Pyrazol Fast Sky Blue 7GUL. The dyestuff is the latest addition to the company's line of Pyrazol colors. Other features of the new dye include its perfect reserve of nylon and acetate fibers and the fact that aftertreatment with U.F. or U.F./Sandofix does not cause degradation of the light fastness.

Sandothrene Copper Red NR Double Paste Ultrasperse is a new Sandoz vat dye with a high degree of stability of shade in all lights. Suitable for application by all vat dyeing methods, it provides the dye-house with a shade that is brighter and redder than the nearest competing type. Bright copper red self-shades with very good all-around light fastness and levelness are listed among the advantages of using this dye. This color is characterized by outstanding fastness to peroxide bleaching.

(Request Item No. J-10)

### Lofted Rayon Yarns

Skyloft, a new lofted filament rayon developed for decorative upholstery, drapery fabrics and carpeting, is being introduced by American Enka Corp. The new yarn, said to offer important new design possibilities in home furnishings fabrics, is the first commercial production of Enka's recently developed bulking or texturizing process on which the firm holds pending patents. The bulked filament yarn provides a host of new and unique properties including improved fabric body and new, pleasing textures and hand.

According to the company, in the special process the yarn passes through an air jet which causes the filament to become wavy and intertwined. This changes the character and appearance of the yarn giving it increased bulkiness and resulting in improved fabric body and texture. Initial production of Skyloft is in 2,200; 2,700;

## WHAT HAS THE ACROPOLIS TO DO WITH HARD CHROMIUM PLATING?



The Parthenon on the Acropolis of Athens

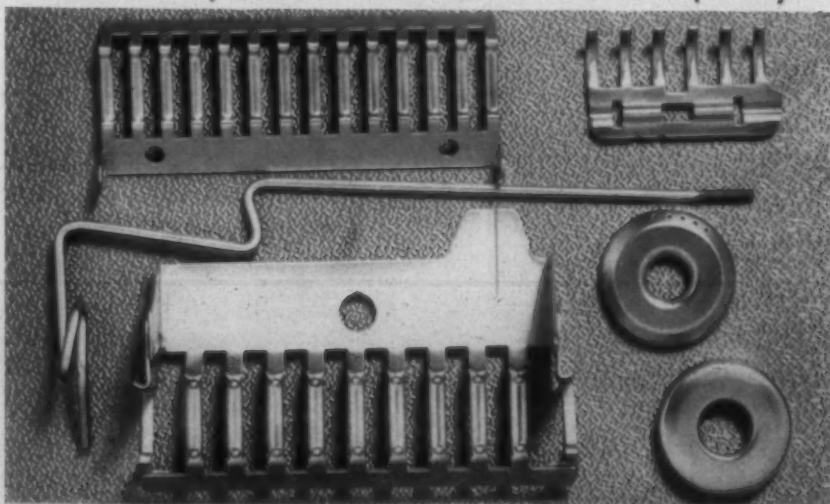
In ancient Greece each city was constructed at the base of a large hill which served as a natural stronghold against hostile neighbors. Such a city was Athens which, over 2400 years ago surrounded itself with a high wall and strengthened its citadel, known today as the famed Acropolis. Many sections of the original barricades still remain, reminding present day Athenians that their city could not have survived without the magnificent efforts of their wise ancestors, who believed that a valued possession deserved their best protection.

When it comes to longer-lasting protection for your textile parts, WALHARD Hard Chromium Plating is your answer. Outstanding workmanship and 20 years' experience exclusively on Hard Chromium back the WALHARD signature, guaranteeing you substantial savings in maintenance and down-time costs. Don't be satisfied with less than the best — Be sure you are getting quality — it costs no more and lasts longer.



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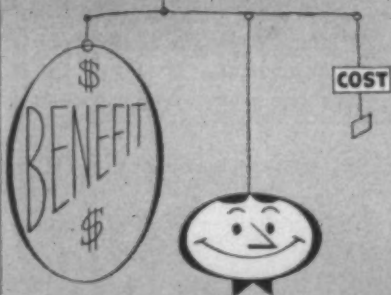
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### FOR THE TEXTILE INDUSTRY'S USE—

4,300 and 5,300 deniers, with denier numbers referring to the yarn size after bulk-ing. All sizes are being made 15 denier per filament with the exception of 4,300 which is 8 denier per filament.

Extensive tests conducted by Enka indicate that the 2,200 and 2,700 denier sizes have interesting applications in drapery and upholstery fabrics. The 2,200 size also can be used in 3 ply tufted carpeting. Other research shows that the 4,300 denier is suited for tufted carpets for the automotive trade and the 5,300 denier for tufted carpets in the home. Skyloft is available in both natural and Jetspun solution-dyed colors. (Request Item No. J-11)

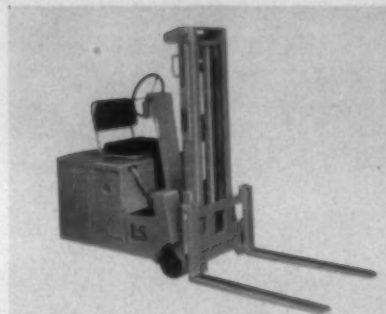
### National Colors

National Red PDC Base is the latest addition to National's line of azoic bases applicable to cotton and rayon. It produces a range of bright bluish-red shades when diazotized and coupled with most naphthols except Naphthol AS-G Disp., which yields a bright, greenish-yellow. Most of these couplings exhibit good fastness to light, and very good to excellent fastness to most wet fastness tests. An outstanding characteristic of this product, when coupled with National Naphthol AS-SW, is its very good fastness to peroxide bleaching. It is therefore recommended for coloring yarns for towel and other materials where peroxide bleaching fastness is required. National Red PDC Base is applicable by all the dyeing processes generally employed for dyes of this type and many of the combinations can be discharged to excellent whites.

National Erie Brilliant Orange 3RC is the latest addition to the company's line of direct dyes, producing bright shades of reddish-orange on cotton and rayon. The exceptionally bright shades produced by this product is one of its outstanding characteristics. It possesses moderate fastness to light and most wet processing. Aftertreatment with urea-formaldehyde resin improves light and washing fastness, while altering the shade appreciably yellower. It dyes cotton-rayon blends to a good union and leaves acetate practically unstained. (Request Item No. J-12)

### Electric Fork Truck

A completely new electric fork lift truck especially developed for medium and heavy-duty operation has been added to its line of materials handling equipment by Lewis-Shepard Products Inc. Designated the L-S Model H, it features a 24-volt electrical system and is particularly suited to situations requiring continuous operation and frequent stopping and starting. It is a rider-type truck driven from a sitting position. An extremely maneuverable counter-balanced fork lift truck, the Model H actually turns in its own length due to its rear-wheel drive. Its turning radius is just 56¼ in. and it stacks goods in aisles as little as 9¼-ft. wide with a 48-in. long load.



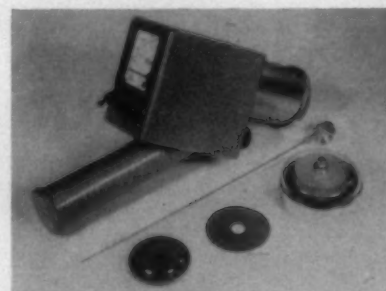
Model H electric fork lift truck (Lewis-Shepard Products Inc.)

The truck is available in any of 4 standard capacities—1,000, 1,500, 2,000 or 2,500 lbs. Total operating weights are only 3,900, 3,900, 4,000 and 4,400 lbs, respectively. Collapsed heights on all units are either 68 or 83 in., with 102 or 132-in. fork elevations. No under-truck adjustments are ever required. All important working parts are exposed by simply lifting the cover at the rear and opening the rear panel doors. In addition, there are no grease points.

The Model H has 3 speeds in both forward and reverse direction. There are 2 separate braking systems, a dynamic braking system and a deadman-type brake. Dynamic braking, which applies when pressure on the accelerator is released, brings the truck to a smooth, gradual stop. The deadman brake operates when the foot is completely removed from the accelerator.

(Request Item No. J-13)

### Static Detector



The portable Statometer for detecting and measuring static electricity charges (United States Radium Corp.)

A new portable instrument, known as the Statometer, for detecting and measuring static electricity charges is now available through United States Radium Corp. The instrument is designed for instant measurement of trouble spots in process flow, providing immediate determination as to whether or not disturbance is caused by static. Use of this instrument, the company says, eliminates costly shutdowns since the Statometer not only indicates the existence of static but also pinpoints the area of disturbance, enabling installation of appropriate static eliminators. Process flow is uninterrupted during measurement.

The Statometer, with a measuring range of 0-500,000 volts, is built around a chamber which ionizes the air in the vicinity of the static disturbance, permitting a

CALLED "THE MOST IMPORTANT DEVELOPMENT IN OPENING AND CLEANING IN TWENTY YEARS"

**The new  
WHITIN**

# AXI-FEED and AXI-FLO

**are fast  
making  
conventional  
opening  
and  
cleaning  
methods  
obsolete!**



High speed photograph of interior of Whitin AXI-FLO showing cotton in process of being cleaned, further opened and blended. Note small size of tufts passing out through delivery pipe at rear.

Providing a new technique in opening and cleaning, installations of the Whitin AXI-FEED attachment for blending feeders and the Whitin AXI-FLO are now setting performance standards higher than were ever possible with conventional equipment. In addition to Opening Room benefits, many other advantages are being realized in subsequent processes because of the improved quality of the cleaned stock.

- **Better Opening**  
Stock opened into very small tufts
- **Increased Cleaning**  
Dirt removed equivalent to 2 or more conventional machines. Production up to 1800 lbs./hr.
- **Additional Blending**  
Unmatched blending: cotton — synthetics
- **Yarn and cloth quality usually improved**  
Preservation of long fibers beneficial  
Neps greatly reduced



Mill installation of two AXI-FLO units. Each is fed by a line of blending feeders.

- **Costs Sharply Reduced**  
Present power costs reduced by 60-75%  
Lower maintenance costs  
Low investment required

Send for full details today!

## Whitin

**MACHINE WORKS**

WHITINSVILLE, MASSACHUSETTS

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ATLANTA, GA. • SPARTANBURG, S. C. • DEXTER, ME.

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If your present water filtration plant is not producing the gallonage of clean, purified water you need, call in a "HOLYOKE" filter engineer.

Specify "HOLYOKE" WATER FILTERS for time-tested design, highest performance, efficient filtration, and economical operation.

Repair parts and service  
for NORWOOD filters.

*Correspondence Invited*

*Established 1863*

## HOLYOKE MACHINE COMPANY

CALENDER and EMBOSING ROLLS  
for the PAPER and TEXTILE INDUSTRIES  
WATER FILTRATION EQUIPMENT  
HOLYOKE, MASSACHUSETTS

### FOR THE TEXTILE INDUSTRY'S USE—

sample charge to be conducted to the instrument, where it is measured. Optional attachments for the compact, hand-held device make measurements in inaccessible areas practicable, while other attachments make the instrument more sensitive in certain areas of application.

(Request Item No. J-14)

### Novelty Bulked Yarns

Celanese Corp. of America has announced the development of a technique to manufacture a range of novelty bulked yarns in which the textured components are separate yarns locked into a high strength core yarn. The technique permits a great variety of textured effects, depending on the types of yarn used and the construction and weave of the fabric. The bulked effects, for example, may be achieved by looping acetate, Celaperm, Arnel or other yarns and twisting them through or around high strength yarns such as Fortisan or Fortisan-36.

Fabrics of these yarns may be woven on plain and box looms. Certain types of these bulked fabrics can be brushed, thereby providing a soft flannel or doeskin appearance. In addition, multi-colored yarns give varied styling effects which make them especially adaptable for women's apparel and home furnishings. The company is prepared to provide technical assistance to mills in adapting existing texturizing equipment to the production of these yarns.

(Request Item No. J-15)

### Flake Wax

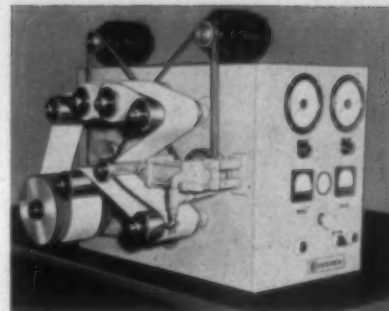
A change in the physical form of its amorphous wax sizing aid, Houghto-Wax, has been reported by E. F. Houghton & Co., suppliers of textile processing products. Composition of the product remains unchanged—a compound of fats and waxes that blends with sizing compound and starch solution. However, it is now being supplied in flake form rather than in solid blocks. The company reports that there are two reasons for the change in the form of the product. The flake form speeds meltability, and is much easier for operators to handle than the blocks.

(Request Item No. J-16)

### Test Napper

A napping laboratory in the form of a desk top, test napping machine has been made available to mills for research and fabric development by the David Gessner Co. The machine simulates, in results, the effects obtained on a Hi-Torc napper. It permits the study of differences in napping effect on fabrics made of various raw materials, on fabric design and on fabrics treated with such chemicals as softeners, dyestuffs, etc.

Dial settings are accurate and indicate the amount of napping power being used, the relative speed between the pile roll and the cloth, the relative speed between the counterpile roll and the cloth, the



Desk top model test napping machine  
(David Gessner Co.)

amount of cloth tension and the number of napping runs required to produce the desired napping effect.

Research in fabric and fiber development in terms of napping effect is greatly broadened and simplified. From quickly interchangeable worker rolls, desired specifications of wire clothing—size, setting and sharpness—can be immediately determined. As a laboratory, the machine greatly expands the field of quality control by permitting thorough testing on fabrics already being manufactured.

(Request Item No. J-17)

### Resist Agent

Superior performance in obtaining white resists under ground shades padded or cover-printed with the novel Procion dyestuffs is cited for the new Procion resist agent recently introduced by Arnold, Hoffman & Co. Inc. The agent is said to give excellent white resists under Procion dyestuffs when used in a British Gum thickening and the printed fabrics possess good storage stability. Attractive possibilities are offered the printer, who may use the Procion resist agent to produce high quality white resists under Procion ground shades in many cases without the need for steaming. He may also produce white resists alongside vat dye illuminated resists under padded Procion grounds.

In the latter style, according to the company, the steaming treatment given to fix the vat dyestuffs also fixes the Procion ground shade. The vat dyes are printed by the normal potassium carbonate/sodium sulfoxylate formaldehyde formula. The resulting prints have the high fastness to light, wet and rubbing which are characteristic of the Procions, combined in many cases with attractive novelty of shade. A further advantage of the new Procion resist agent is said to be its ease of removal by a short treatment in boiling detergent and soda ash in the event that faulty printing should be detected before over-padding with the Procions.

(Request Item No. J-18)

### V-Belting

A new link type V-belting is being distributed by The Dayton Rubber Co. to further expand its complete industrial line of V-belts for all types of power transmission drives. Known as Thoro-Link V-belting, it is designed for use where the



Thoro-Link V-belt (The Dayton Rubber Co.)

conventional or endless type of V-belt cannot be installed or replaced without causing costly machine down time.

The new link belting is extremely flexible and will operate efficiently over small sheave diameters. Each link is pre-stretched under controlled tension. Reinforced rivets provide a positive lock-fit. Thoro-Link V-belt comes in all sizes in both regular and oil-proof construction to cover every type of application. The regular belting, red in color, is for use on the average installation requiring a standard F.H.P. or multiple V-belt drive. The green oil resistant Thoro-Link V-belt is impregnated with a special Neoprene compound. It is designed for oily or high temperature operating conditions.

(Request Item No. J-19)

### Hand Knotters

Stellamcor Inc. has announced the availability of various hand operated knotters made by Cook & Co. Ltd. The B Type winder's knotter covers a range of counts from 8s to 80s, cotton. The knotter has one setting for yarns from 8s to 30s and another from 30s to 80s. Another B type knotter, No. 2, ties winder's knots on 2s to 10s condenser yarns or 4s to 10s cotton yarn.

With special individual settings the D.E.W. weaver's knotter will tie silk, rayon or nylon up to 200 denier. One further setting covers cotton and fiber yarns from 10s to 50s and 20/2 to 100/2. Another setting on this knotter covers yarns from 50s to 140s and 100/2 upwards. Usually used for multi-strand yarns, the G.W.H. weaver's knotter will tie yarns up to the equivalent of 12s. With a special setting 4s to 10s condenser yarn can be tied as can a limited range of woolen hosiery yarns and heavy silks. Soft spun cotton yarn can usually be tied in counts as heavy as 2s using the G.W.H. knotter.

The fisherman's knotter has its best range between 12s to 50s and 20/2 to 80/2 worst-



## **Finest Coiler you can buy!**



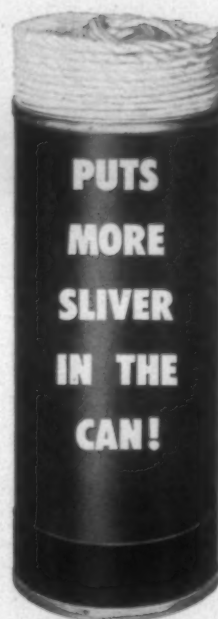
**BUILT  
TO  
LAST  
LONGER!**

**BOTH HEAD  
AND BASE  
SWIVEL  
FOR  
ADJUSTMENT**

**SAVES  
LABOR**

**EASIER  
TO  
INSTALL**

**TAKES  
LESS  
FLOOR  
SPACE**



**PUTS  
MORE  
SLIVER  
IN THE  
CAN!**

## **McDONOUGH UNIVERSAL CARD COILER**

(Patents Pending)

This coiler is its own best salesman. It outsells all the rest put together because it out performs all others. It saves labor by putting more sliver in the can. Its quality construction, including sealed ball-bearings, hardened steel gears, etc., means extra years of dependable service. Ask for free folder with complete specifications.

Let this coiler prove its worth to you in your mill. Have one installed on a

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Since 1890

**McDONOUGH POWER EQUIPMENT, INC.**

MACHINE & FOUNDRY DIVISION

**McDONOUGH, GA., U.S.A.**

#### FOR THE TEXTILE INDUSTRY'S USE—

ed yarn. Cotton yarns from 12/3 to 30/2 can also be tied with this knotter. Silk yarns from 75 to 300 denier can be tied with the fisherman's knotter with a special setting. These specifications are given only as a guide by the company which cannot say exactly what a knotter will do until samples of yarns have actually been tried.

The company also announces its appointment as sole agents in the U. S. and Canada for the Antex Speedotex, an instrument for measuring the speed of yarns. The instrument is used in the same way as the stroboscope for the measurement of speeds of rotation. The yarn is threaded around a

pulley in which there is a small hole near the outer rim. Light from a flashing lamp is arranged to pass through this hole and if the frequency of flashing is adjusted appropriately, the hole appears to be stationary. Thus the speed of rotation can be determined and, knowing the diameter, the yarn speed is deduced.

(Request Item No. J-20)

#### Flooring Material

An extremely tough, long-wearing, trowel-applied flooring material, available in 9 colors and more than 40 different formulations, has been announced by Selby, Battersby & Co. Known as Selbalith composi-

tion flooring, this material is a laboratory-controlled formulation of magnesium oxychloride cement. It provides durable, resilient, slip-resistant floors in industrial plants.

Selbalith is an economical flooring material for both new installations and for resurfacing old floors. It can be applied over wood, concrete or steel. Anchoring is made positive by use of mechanical bonds, such as wire or expanded-metal lath, by roughing the surface or by means of an approved latex binder. The flooring is available in the following standard colors: natural, tan, light and dark red, light and dark green, black, and light and dark brown. The pigments are an integral part of the mix and are dispersed throughout the entire thickness.

The new material has a compressive strength range of from 4,800 to 6,000 p.s.i., depending upon formulation. Properly applied, the composition flooring will give years of trouble-free service without chipping, cracking or coming loose. The aggregates used in this flooring material provide highly slip-resistant surfaces, even when wet. Because Selbalith will not burn, it fireproofs the surfaces it covers. The material is light in weight and will not dust off.

(Request Item No. J-21)

*Complementing  
each other*

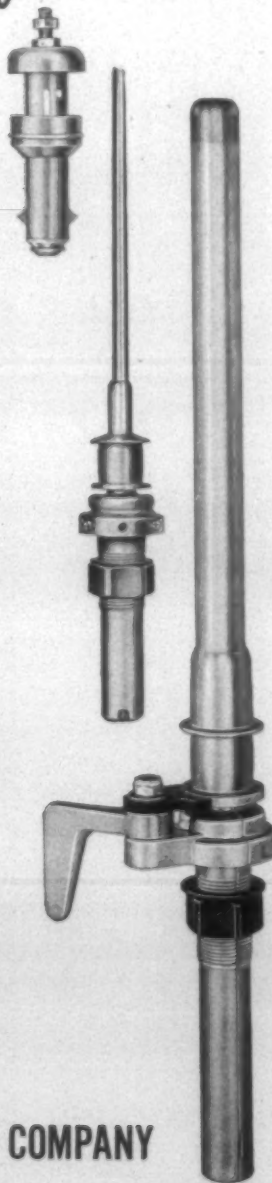
## HARTFORD

- Autolatching Bobbin Hangers for easier creeling
- Ball Bearing Filling Spindles: Top Drive & Acorn Drive
- Ball Bearing Warp Spindles — for Paper Tube or Wood Bobbin

Pre-lubricated ball bearings . . .  
5 years, no lubrication  
Spindles engineered for  
special applications

### HARTFORD MACHINE SCREW COMPANY

DIV. OF STANDARD SCREW CO. • P.O. BOX 1776 • GREENVILLE, S.C.



#### Flocking Machine



Peco Model 7 flocking machine (Progressive Equipment Co.)

A new, low-cost, compact flocking machine, designed to handle a wide variety of work in industrial fields, has been announced by Progressive Equipment Co. The new machine, the Peco Model 7, has a self-contained air supply to prevent compressor overloads in volume flocking operations. Improvements over the machine first introduced in August 1956 include a roller chain drive with ball bearing; totally enclosed, overload-protected motor; a long-wearing nylon spiral feed brush; a flexible steel baffle for positive volume control; a separate overload-protected fan motor assembly, and accessories for special requirements.

The compact machine is a rugged, self-contained, production-type unit yet its 18 gauge steel outer case measures only 15x16x39". The complete unit weighs less than 100 lbs. The machine is mounted on 2 cast-

ers for easy portability. A thumb control switch on the nozzle at the end of the flexible discharge hose provides finger-tip control of flocking. (Request Item No. J-22)

### Pinned Cylinders

Robert A. Main & Sons Inc. has announced that it is now producing steel pinned cylinders with heat treated, steel, pointed pins in many combinations of pin spacings and pin angles. These steel cylinders are for use in many types of perforating, punching, tearing, picking, etc., operations. These cylinders can be designed so they can be repinned if necessary. They can also be made for all types of temperature and wet conditions. Spike rolls can be made in any combination of diameters up to 30 in. and lengths up to 22 ft. A repinning service is maintained by the company. (Request Item No. J-23)

### Saran Lining

The Dow Chemical Co. has announced that it has developed a new saran lining for pipe, valves, pumps and fittings used by industry in handling corrosive liquids and gases. In addition to having saran's singular immunity to chemical and abrasive attack, the new gray lining has a 50 per cent reduction in its coefficient of thermal expansion. It therefore expands and contracts to approximately the same degree as its steel casing. This makes possible its use in a wider range of temperatures.

Operations from well below zero up to 200° F. can be handled by the new lining without damage. Field tested for 18 months under extreme variations in temperature, the lining also shows improved impact resistance. Complete saran-lined piping systems now are possible with the recent introduction of saran-lined centrifugal pumps. (Request Item No. J-24)

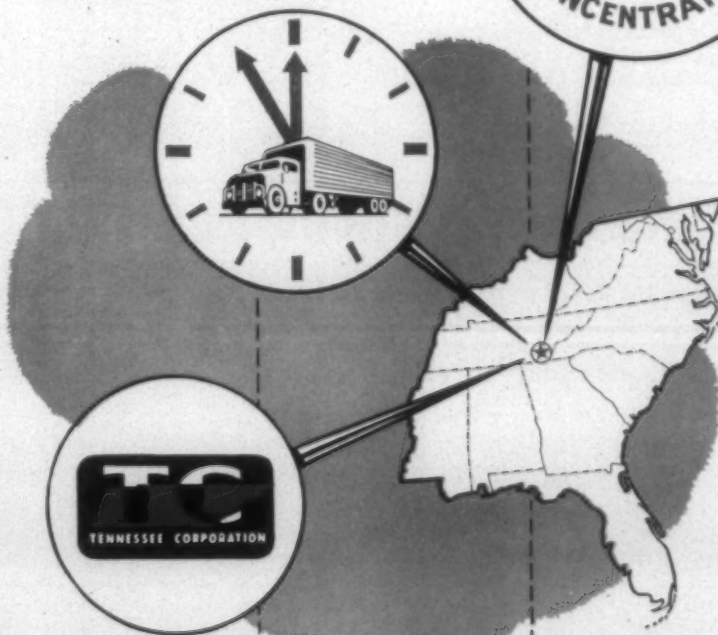
### Steel Shelving

A broad line of adjustable steel shelving for use in industrial plants has been announced by Penco Metal Products Division, Alan Wood Steel Co. Offering users a wide selection of shelving equipment to meet virtually every storage need, the Penco line includes plain shelving in 240 different size combinations and ledge shelving in 735 different size combinations.

Three basic types of plain or ledge shelving are available: (1) open type shelving, consisting of posts, shelves and braces only; (2) closed type shelving having posts, shelves, backs, sides, partitions and bases; and (3) closed type having doors and locks in addition to the equipment on Type 2. The 6 most popular standard shelving configurations—plain and ledge in either of the 3 basic types—can be readily adapted to provide an almost indefinite number of variations of size, arrangement and function. Adaptations are made by equipping the shelving with a wide assortment of standard equipment, including dividers, bin fronts, label holders and parts boxes. (Request Item No. J-25)

## TC HYDRO SODIUM HYDROSULFITE CONCENTRATED

As miners of Sulfur Bearing Ores, we are now producing another Basic Sulfur Textile Chemical, TC HYDRO for the Southern Textile Industry.



#### HIGHEST QUALITY

TC HYDRO is a dry, white, free flowing, crystalline powder of uniform size and structure. It is dust-free, assuring highest stability and uniformity.

Phone, wire or write for literature and test samples if desired.

#### FAST DELIVERY SERVICE

Our location in the heart of the Southern textile industry, permits us to render over-night truckload service to most Southern textile plants. Small lot shipments are available from centrally located warehouses.

#### DEPENDABLE SUPPLY

Long a trusted source of Sulfuric Acid, Sulfur Dioxide, Organic Sulfonates and other textile chemicals, we are utilizing our know-how and basic position in Sulfur Chemistry to produce another quality product for the textile industry.

TENNESSEE  CORPORATION

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# For the Mill Bookshelf

## Exsize-T

The Pabst Brewing Co. has published a second edition of its leaflet on Exsize-T desizers. The leaflet points out that Exsize-T and Super Exsize-T are unusually efficient desizing agents manufactured specifically by Pabst for the textile industry. Said to be outstanding in their capacity to liquefy and solubilize starch and starchy products, the Exsize-T desizers are not chemicals but are enzymes. Any type of starch can be degraded and solubilized by Exsize-T, the leaflet points out. A review of application data is included in the pamphlet.

(Request Item No. J-26)

## Dilution Of Hydrogen Peroxide

Detailed and concise information on the methods and equipment for diluting commercial grades of hydrogen peroxide is contained in a new booklet offered by the Solvay Process Division of Allied Chemical & Dye Corp. The booklet includes dilution formulas for 27½ per cent, 35 per cent and 50 per cent hydrogen peroxide, information on containers, stability tests and analysis of dilute solutions as well as 4 easy-to-use dilution charts. (Request Item No. J-27)

## Electric Brakes, Clutches

Warner Electric Brake & Clutch Co. has announced publication of a new Catalog Digest WEB 6292 giving easy-to-read facts about electric brakes, clutches and controls for miniature mechanisms or high torque machine drives. The attractive 8-page booklet can be obtained by using this journal's reader service request cards.

(Request Item No. J-28)

## Gate Valve

The Lunkenheimer Co. is offering a 4-page, file-size bulletin on its King-Clip gate valve for 125 and 150-lb. service applications. The bulletin, completely illustrated with cutaway drawings and photographic reproductions, includes detailed data on the many different types of King-Clip gate valves now available. Tables of s.p. and w.o.g. pressure ratings are given for flanged and screwed King-Clip valves, plus their dimensions, parts identification and descriptions of the various metals and alloys used in their manufacture.

(Request Item No. J-29)

## Saturable Power Reactors

The Wheelco Instruments Division of the Barber-Colman Co. is offering a new 32-page bulletin (F-8383), an application guide for the use of saturable power reactors. The bulletin discusses saturable power reactor uses, turn down character-

istics and the application of automatic control to these units. With proper temperature measuring instruments and a d.c. source, usually a magnetic amplifier, it is possible and very practical to use a saturable reactor to control a.c. power to furnaces, heaters and other equipment supplying resistive loads.

(Request Item No. J-30)

## PVP Booklet

A detailed, 48-page booklet on the versatile, high molecular weight polymer PVP (polyvinylpyrrolidone), describing its chemical and physical properties and the numerous applications so far developed, has been published by the Acetylene Chemicals Department of Antara Chemicals, a sales division of General Aniline and Film Corp.

(Request Item No. J-31)

## Eclipse Starches

A new 4-page technical data sheet entitled "Eclipse Starches for Textiles" is available from the A. E. Staley Mfg. Co. The data sheet describes the use of thin-boiling starches in the textile industry, with particular emphasis on warp sizing. A table lists common fabric constructions and the starches preferred for each class. Physical and chemical data on thin-boiling starches are also included.

(Request Item No. J-32)

## Rotary Pump

The Dexter Folder Co. offers a new 4-page, 2-color bulletin on Models 2, 3 and 6 of the Dexter-Conde Dri-Air pump, an oil-free, rotary vane pump for vacuum and pressure applications. The illustrated brochure describes the features, both standard and optional, of this positive displacement unit and gives complete specifications and operating recommendations for the 3 sizes and capacity-ranges in which the pump is available. Drawings and accompanying tables give dimensions of all models. The bulletin also pictures and describes the 2 types of air filters for the pump, each with replaceable filter elements, as well as an exhaust muffler furnished for locations where extra quiet is desired.

(Request Item No. J-33)

## Bobbins

A new catalog covering the complete line of bobbins made by the Lestershire Spool Division, National Vulcanized Fibre Co., for use in the textile industry has been made available. Entitled "Lestershire Bobbins," this 12-page catalog describes and illustrates standard and special bobbins made from: (1) vulcanized fibre; (2)

Phenolite; (3) hard, close-grained Northern Maple; (4) steel; (5) aluminum; and (6) special alloys. Sixteen typical examples of 5 basic types of bobbin construction—hammered, threaded, anchor screw, screw type and tubelock—are explained and shown.

This catalog illustrates the adaptability of Lestershire bobbins to numerous specific applications. Typical examples include spools for winding textile threads and yarns. The stringent quality tests that all Lestershire bobbins must pass—such as smoothness, concentricity and dynamic balance—are also shown and described.

(Request Item No. J-34)

## V-Belts

A booklet describing the machines and processes used in the production of V-belts has been issued by the Goodyear Tire & Rubber Co. Rubber compounding, preparation of fabric, building steps, curing and finishing are subjects for one-page descriptions of V-belt manufacturing operations.

(Request Item No. J-35)

## Powdered Acid

The properties and uses of Oakite Drycid, the recently introduced powdered acid scale and rust remover, are described in a service report published by Oakite Products Inc., manufacturers of industrial cleaning and related materials. The service report points out the convenience inherent in shipping, storing and using a powdered rather than liquid acid; the lack of bothersome acid fumes; and the material's increased safety on various metals. One of the major advantages discussed is Drycid's greater safety when used to descale systems containing dissimilar metals. Recommended solution concentrations and application methods are given in the service report.

(Request Item No. J-36)

## Steel Bars

An engineering report, "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on Stressproof Steel Bars" has just been released by La Salle Steel Co. The 12-page paper discusses, in detail, the chemistry of the raw material used in the production of Stressproof and explains how the controlled addition of copper results in an approximate 10% increase in machinability over Stressproof without copper; 25% to 150% better tool life, and improved resistance to wear and corrosion. Various tests used to determine wear resistance are outlined, including a constant pressure wear tester developed by the company. The wearability of Stressproof has consistently proven superior to other steels of similar or even greater hardness.

# Service - Efficiency



Office building and machine shop

Located in the heart of the textile industry, Gaston County Dyeing Machine Company is in a unique position to serve your needs for processing equipment, recently expanded facilities enhance this position.



New assembly plant

## SALES REPRESENTATIVES

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*Stainless Steel Fabricators — Process Tanks and Pipe*

# Woolen and worsted textile machinery

## ★ PREPARATORY MACHINERY

A complete line of accessories, supplies and maintenance parts.

Automatic Box Dusters    Cone Dusters  
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Automatic Oilers    Rag Pickers  
Fearnought Pickers    Mixing Pickers  
Wool and Rayon Openers    Burr Pickers

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GARNETT WIRE  
NAPPER CLOTHING  
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RUBB APRONS

The skillful integration of Davis & Furber methods, materials and machinery with your mill results in "COORDINATED PRODUCTION." It means increased profits for you. Ask us for information on this. Send for copy of the D&F News to help with your planning.



## ★ CARDING MACHINERY for

Woolen, Worsted, Asbestos, Rayon, Felt and Waste  
Bramwell Feeders    Sample Cards    Garnett Breasts  
Tape Condensers, Single and Double Apron, Balling  
Heads, Grids or Screens, Can Coilers, Machines for  
Mounting Card Clothing, Doffer Combs, Waste End  
Conveyors, Card Grinders, Center-Draw Broad Band  
Intermediate Feeds, Burr Removers.

## ★ SPINNING AND YARN MACHINERY

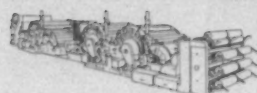
Spinning Frames for Wool, Shoddy, Cotton, Rayon and  
Mixtures, Spinning Frames for Carpet Yarns, Standard  
Type and Large Package Mules, High Speed Warp  
Spoolers, Warp Dressing Frames, Beamers, Warp  
Compressors, High Speed Warping Systems  
Reels, Pin or Pinless • Dresser Creels • Skein Reels

## ★ FINISHING MACHINERY

Single and Double Acting Nappers for Wool, Rayon,  
Worsted or Cotton Goods, Woven or Knitted.  
14, 20, 24, 30 and 36 Rolls  
Napper Grinders    Chinchilla Machines

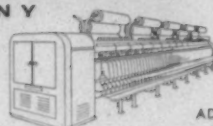
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MACHINE COMPANY



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## FOR THE MILL BOOKSHELF

the company reports. The addition of copper to Stressproof further improves the steel's resistance to wear.

Another section of the paper deals with the abnormally heavy drafting practice and exceptionally high furnace temperatures used in the production of Stressproof with copper. Ten curves, charts and tables deal with subjects such as (1) tests in customer plants showing improvements in tool life and the comparative production rates; (2) influence of per cent reduction and furnace temperatures on tensile and yield strengths of steel; (3) longitudinal residual stress in bars drawn through conventional and "T" dies, and other engineering data.

(Request Item No. J-37)

## Diamond Chemicals

Graphically depicting in word and picture its diverse, growing family of chemical products for industry and agriculture, Diamond Alkali Co. has just published the 5th edition of "The Story of Diamond Chemicals—Chemicals You Live By." Highlighting the important contributions of Diamond organic and inorganic chemicals to building a better America through chemical progress, this newly revised and enlarged, 32-page booklet presents a panoramic picture of these basic materials, their principal applications, and their production in a style and format which are both interesting and informative to technical and non-technical readers.

(Request Item No. J-38)

## Electric Brakes

Warner Electric Brake & Clutch Co. has announced a complete, fully illustrated story of its newest electric brake designed for fail-safe applications. This authoritative 36-page illustrated report for design engineers includes photographs, drawings, diagrams, and complete explanation of operation, selection factors, torque characteristics and controls.

(Request Item No. J-39)

## Wool Report

The Wool Bureau Inc. has expanded its service to the wool industry with the publication of the first of a new series of wool science and technology reports. Titled "Carbonizing Wool Stock, An Improved Sulfuric Acid Method," the report was prepared by the bureau's department of science and technology and is based on discoveries made in 1955 by 2 scientists working in the laboratories of the Commonwealth Scientific and Industrial Research Organization at Melbourne, Australia.

The report deals with an improved process for removing burrs, grass seed and other vegetable matter from raw wool, which is usually accomplished with sulfuric acid, with some acid damage to the fiber. The addition of a detergent in the sulfuric acid bath minimizes this damage and results in stronger wool yarns and greater wool yield. Copies of the report on the new carbonizing process are available free of charge from the Wool Bureau, 16 W. 46th St. New York 36, N. Y.

# Serving The Textile Industry

## Hilton Davis Plans To Expand Colors Division

The Hilton Davis Chemical Co., textile colors division, Greenville, S. C., plans to construct a 20,000-sq.-ft. building to house its Southern sales division offices, laboratory and warehouse. The construction is expected to begin in November and is to be completed in early Spring. The new facilities in Greenville will serve West Virginia, Virginia, the Carolinas, Georgia, Alabama, Tennessee, Louisiana and Arkansas.

## Du Pont Prepares For Nylon Production At Richmond Plant

The Du Pont Co. has announced it would discontinue the production of Type 168 Super Cordura high tenacity rayon at its Richmond, Va., plant on Dec. 1, in preparation for starting up its new nylon plant scheduled to begin producing in January 1958. Employees producing Type 168 rayon, made only at the Richmond plant, will be trained for jobs in the new nylon operation or transferred to the manufacture of Type 272 Super Cordura—the new high strength rayon used for tire cord and other industrial products. Type 272 Super Cordura will continue to be made at capacity levels at the Richmond facility. The company announced its new nylon plant for Richmond in September 1956 and construction started soon thereafter. The plant is designed to produce 40,000,000 lbs., annually, of nylon fiber for tire cord and other industrial products.

## Platt Bros. Opens Textile Machinery Plant In England

Platt Bros. Ltd., textile machinery manufacturer, has opened a new £750,000 plant in Oldham, England. The new facility is to be used in the production of cotton and wool carding and spinning machinery. The new plant covers an area of 250,000-sq.-ft. and is planned on production flow and assembly line methods. A company spokesman said that the firm was faced with a future which would probably be more competitive than anything in the past and in which efficiency within a works would be more than ever the foundation of success.

## Wm. L. Barrell To Acquire Hesslein & Co. Nov. 1

William L. Barrell Co. has negotiated for the acquisition of Hesslein & Co. and the closing date has been set for Nov. 1, according to a joint report from J. Morton Curran Jr., president of Barrell, and Harold J. Starke, president of Hesslein. The ac-

quisition will give the Barrell organization approximately 192,000 spindles and 4,320 looms. Barrell production will include Lakeside Mills Inc., Guntersville, Ala.; Plymouth Mfg. Co., McColl, S. C.; and Belle Vue Mfg. Co., Hillsboro, N. C. In addition, the company will have sales representation of Commander Mills, Sand Springs, Okla.

The consolidation brings together a combination of firms with long histories in the textile market. Hesslein & Co. extends back over 90 years. William L. Barrell Co., with a history of 60 years in the industry, was acquired by Ben T. Comer and associates last January. Subsequently, Morton Curran & Co. joined forces with Barrell. The Curran organization has represented textile merchandising and production continuously for over 50 years.

## Hobbs-Alquist Winders Now Being Made In America

In 1953, the Hobbs Mfg. Co. of Worcester, Mass., introduced to the U. S. the Hobbs-Alquist line of winders, products of Germany. Now the company announces that it is manufacturing the line in its Worcester plant.

Wide demand for these winders and the need for certain improvements to accommodate American procedures over and above the basic advantage of the original line, chiefly tension control, lies behind the decision to produce the line in this country. The American-made units feature improved design, better torque control and better tension curve. Also, as the manufacturer points out, there is a distinct advantage in use of all-American parts and in servicing of the units.

## F. M. Buresh To Consult On Non-Woven Trade Problems

Francis M. Buresh, inventor of the random web process for use in the manufacture of non-woven fabrics, has announced the opening of a complete engineering service for the non-woven fabric trade. Offices and other facilities are located in Blandford, Mass., where he has made his headquarters. This service includes all phases of problems for which either the novice or experienced firm might be seeking help ranging from preliminary market surveys through plant installation and product development.

After doing the original work on the random web process, Mr. Buresh developed the Rando-Feeder and Rando-Webber commercially with the Curlator Corp., East Rochester, N. Y. As Curlator's sales manager, he introduced the machinery to the trade for use in research, development and production. His experience includes the setting

up of complete plants with various types of finishing ranges as well as the development of a number of new grades of non-woven industrial and apparel fabrics and their application to various specialized trades. In co-operation with the Rodney Hunt Machine Co., Orange, Mass., Mr. Buresh developed the double screen saturator.

The service is offered because many textile and chemical firms are anxious to diversify into this new branch of industry but as yet cannot secure experienced help for the assembling of the components of an automatic production line for the specific product required. The science of non-wovens, both in the field of machine development and product development from present fibers and those still to be developed, is in its infancy.

Latest and complete cost estimates, detailed engineering service for complete manufacturing facilities, supervision of erection and installation of machinery, and training of personnel to operate the plant are all available through the service.

## Chemstrand Building Plant, Moves District Sales Office

The Chemstrand Corp., New York City, is building a new Acrilan acrylic fiber plant in Coleraine, Northern Ireland. The new facility is to be operated by Chemstrand Ltd., a wholly-owned subsidiary of the company. A company spokesman said that work was also being done on a yet undisclosed method of dyeing Acrilan-wool blends in solid shades in dyeing times similar to those for 100% wool.

In another announcement, it has been reported that the company has moved its district sales office for Acrilan and Chemstrand nylon from Dedham, Mass., to 197 First Ave., Needham Heights, Mass. Sales territory of this office includes Vermont, Connecticut, Rhode Island, Massachusetts, Maine and New Hampshire.

## Potato Starch Components Being Sold By Stein Hall

The technical division of Stein Hall & Co. Inc., New York City, has announced that amylose and amylopectin, the principal components of potato starch, are being marketed by them in commercial quantities in the U. S. for the first time. Through an agreement with A.V.E.B.E., one of the leading manufacturers of potato starch in Holland, Stein Hall has acquired exclusive sales rights in the U. S. and Canada on amylose and amylopectin. The products are now being separated on a commercial scale by a new A.V.E.B.E. process.

Although Stein Hall will not produce the products, it does expect to market the Dutch products in quantities of millions of

## SERVING THE TEXTILE INDUSTRY—

pounds a year. Applications for amylose are still largely experimental. Amylose, possessing film forming properties, is expected to find widespread use in the textile industry. Amylopectin, which has properties somewhat like amioica, has been used in textile sizing and finishes to stiffen and strengthen fibers and prevent fuzziness. Stein Hall will be actively engaged in research and the development of new markets for both these products. Superlose has been selected as the name under which the company will sell amylose, while Ramalin is the name for amylopectin.

### Livermore Organizes Engineering Division

H. F. Livermore Corp., Boston, Mass., has announced the organization of a new division, Orama Engineering Co., which will develop, manufacture and promote new products principally for the textile industry. The new division, which will operate from the same address as the parent company, will give particular attention to ideas that will improve weave room operation. Orama maintains a group of thoroughly experienced loom men, acting in service and liaison capacity between the company's operations and the mills. The function of this group is to assist in the original installation of items produced by the company and to help in solving loom mechanical problems encountered by individual mills.

### Barber-Colman To Lease Building In Philadelphia

The Barber-Colman Co., Rockford, Ill., will lease a new office and distribution building to be constructed in Philadelphia, Pa. The 12,000-sq.-ft. building is to be of single-story design and will be partially air-conditioned. Barber-Colman is one of the country's largest manufacturers of automatic controls and textile machinery. The negotiations for the long term lease were handled by Frank G. Binswanger Inc., national industrial realtors.

### Dow Chemical Co. Sets Up Zefran Sales Organization

Formation of a sales group in The Dow Chemical Co.'s textile fibers department has been announced. The sales group, comprising salesmen, market research and product information personnel, will operate from department headquarters at Lee Hall, Va., where the company is building a fiber research, development, production and sales center. Production facilities are expected to be completed in early 1958. A Zefran sales office has also been established in the New York market at Dow's offices, 45 Rockefeller Plaza.

### Predicts Du Pont Over \$2 Billion This Year

The Du Pont Co. reports that its sales in 1957 will probably exceed \$2 billion for the first time in the history of the company,

according to the finance committee chairman, Lamont du Pont Copeland. In 1956, the chemicals and textiles producer had sales totaling in excess of \$1.8 billion. The previous sales record for the firm was \$1,909,197,444 achieved in 1955. Mr. Copeland noted that while 1957 expected earnings are estimated to be above those of 1956, they will be well below the record earnings of \$431,555,884 reached in 1955.

### Cotton Council Moves Washington Offices

The Washington, D. C., staff of the National Cotton Council has moved to new quarters in Room 502 of the Ring Bldg. at 1200--18th St., N.W. This long-awaited shift has alleviated crowded conditions and allows the staff to be integrated into a single working area. The Washington office of the council has been located in the Marsh Bldg., 1832 M St., N.W., since October 1949.

### U. S. Rubber To Spend Over 120 Million For Research

United States Rubber Co. plans to spend a minimum of 120 million dollars on research and development over the next 5 years, according to a company spokesman at the dedication of the new research center in Wayne, N. J. This spending for research and development is part of a 5-year program of expanded effort at the research center and at the company's laboratories at 22 locations. Part of the spending will be directed into the textile field. The effort in this area will search for stronger textiles to be used in reinforcing rubber products such as automobile tires, conveyor belts and industrial hose.

### Container Stapling Corp. Building New Addition

Container Stapling Corp., Herrin, Ill., has broken ground for a new factory building which will be completed in early 1958. This latest addition of 20,000 sq. ft. will make a total of 100,000 sq. ft. in use at that time. This modern facility will increase the present production area and also provide more general sales office space.

Harmonizing with the present newest building, completed in 1957, the structure will be built of Stransteel, air conditioned and completely sprinklered throughout, with natural daylight coming through soft green fiberglass windows. Strong demand for Container Stapling machinery, with increasing foreign exports, requires additional production space to keep pace with general sales of the company's products.

### Graton & Knight Co. Buys Warren Belting

Walter W. Weismann, chairman, Graton & Knight Co. Inc., Worcester, Mass., 106-year-old manufacturer of industrial leather products, has announced that the company has purchased the Warren Belting Co., Worcester, and that it will be operated as a

division of Graton & Knight. The sales staffs of both companies will be maintained intact but will operate independently. Present plans call for the expansion of the mechanical packings division, the enlargement of the case and strap division and the establishment of additional facilities for vastly increased manufacture of nylon-core belting.

### Installment Plan Stocks Offered Dow Employees

An offering of 200,000 shares of common stock of The Dow Chemical Co., Midland, Mich., to its employees and those of its subsidiaries and certain associated companies has been authorized by the company's board of directors. The new offering, to be known as the 1957-58 Employees' Stock Purchase Plan, will be the ninth since the company started selling common stock to its employees on an installment basis.

### Roberts Co. 1st Half Sales Best In Company's History

The Roberts Co., Sanford, N. C., manufacturer of spinning frames and change-overs, has announced that its sales for the first half of this year were over \$2 million, the highest in the company's history. Sales for the first six months are reported to be 40% over the similar period last year. The backlog as of July 15, 1957, was reported to be \$2,200,000 with added Canadian contracts augmenting domestic business. To handle its increasing volume of business, the company has added substantial additional manufacturing facilities and also enlarged its management and engineering group.

Statement Required by the Act of August 24, 1912, as Amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 223), Showing the Ownership, Management and Circulation of Textile Bulletin, published Monthly at Charlotte, N. C., October, 1957.

State of North Carolina

County of Mecklenburg

Before me, a Notary Public in and for the state and county aforesaid, personally appeared Junius M. Smith, who, having been duly sworn according to law, deposes and says that he is the General Manager of Textile Bulletin and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946, embodied in Section 223, Postal Laws and Regulations, to wit:

That the names and addresses of the publisher, editor and general manager are:

Publisher, Clark Publishing Co., Charlotte, N. C.; editor, Jack Kissiah, Charlotte, N. C.; managing editor, Jack Kissiah, Charlotte, N. C.; general manager, Junius M. Smith, Charlotte, N. C.

That the owner is: Clark Publishing Co., Charlotte, N. C.; John W. Clark, Trustee, Concord, N. C.

That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of the total amount of bonds, mortgages, or other securities are: None.

(Signed) JUNIUS M. SMITH,

General Manager.

Sworn to and subscribed before me this 4th day of October, 1957.

HENRIETTA Q. MONROE,

Notary Public.



Clear sparkling colors produced with more economical dyestuffs are among the advantages assured by use of TEN-O-FILM Starches.

## For a clear size that enhances **COLOR** use **TEN-O-FILM®** starches

For use with the new quick curing or polymerizing resins, you'll find no equal to TEN-O-FILM Starches.

Available in a range of fluidities to meet any required fabric stiffness, these unique starches retain their free-flowing characteristics at the lower temperatures employed in finishing.

Also, because both sizing and desizing operations using TEN-O-FILM are conducted at lower temperatures, with "bleeding" thereby reduced, yarns can be dyed with more economical dyestuffs.

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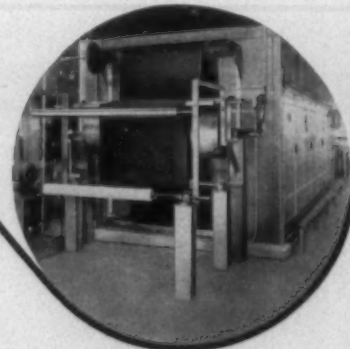
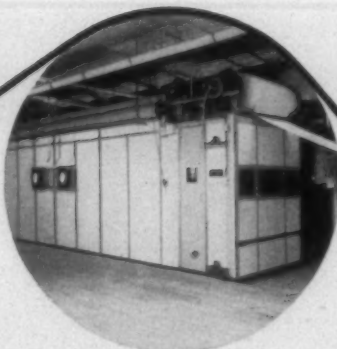
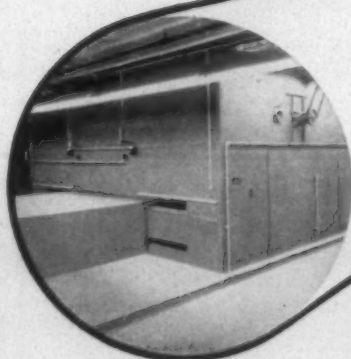
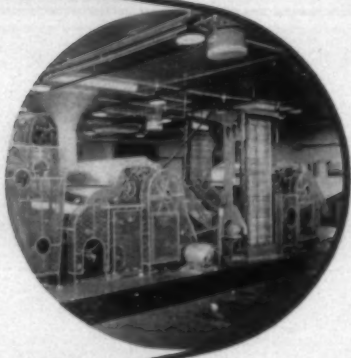
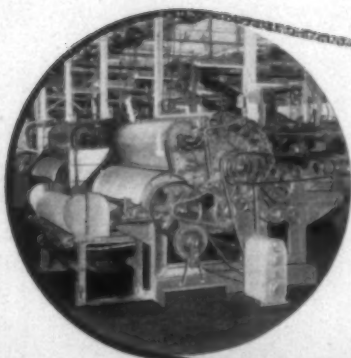
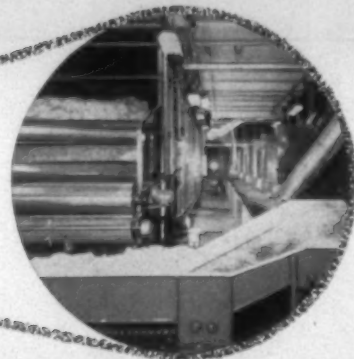
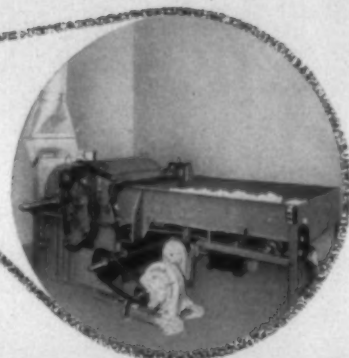
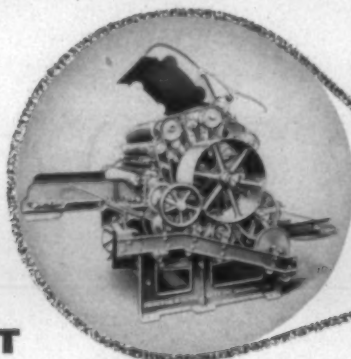
## NON-WOVEN FABRICS

### FROM BALE TO FABRIC

WITH



EQUIPMENT



Successful non-woven fabric manufacturers today recognize the garnett as the prime web forming apparatus for making top quality non-woven fabrics without sacrificing high production. By choice of type or arrangement of these garnetts, a complete range of non-wovens can be made, that is, parallel fiber array, cross lapped, or isotropic.

Production now being obtained on Proctor web forming equipment ranges from 100 to 700 lbs/hr in widths of 60" to 96", depending on the desired requirements of the specific material being processed.

Proctor can supply complete non-woven production ranges for handling natural and synthetic fibers from the initial opening and blending through the required pre-carding and final web formation.

Non-woven fabrics are an ideal end use for many reprocessed fibers. Proctor has a complete line of equipment for waste reclamation suitable for upgrading and preparing fibers for the manufacture of these fabrics.

A wide range of drying and curing machinery is also available, engineered to handle the individual mill's fabric construction and bonding agent.

Auxiliary slitting and batching machinery can be furnished to complete the range.

**PROCTOR & SCHWARTZ, Inc.**  
PHILADELPHIA 20, PA.

Proctor Equipment For Manufacturing Non-Woven Fabrics . . .

- BALE BREAKERS
- PICKERS
- SHREDDERS
- REPROCESSED FIBER GARNETTS
- BLENDING FEEDS
- BLENDING BINS
- CARD AND GARNETT FEEDS
- WEB FORMING GARNETTS
- CROSS LAPPERS
- DRYERS
- CURERS
- SLITTERS
- WINDING HEADS

## A Special Report

on current activities in the field of

# NON-WOVEN TEXTILES

This special report covers the non-woven field from aspects of web forming, binding, drying, finishing and marketing. It is not the thinking of one man or one organization, but rather it is a grouping of experience and opinion of many men in the supplier, manufacturing and marketing segments of the industry. This journal offers the report in the spirit of objectivity and firmly believes that it represents the most advanced thinking on the subject.

NON-WOVEN fabrics are said to have three main advantages, in general, over their woven counterparts. These advantages include: (1) providing for diverse styling effects by incorporating features such as elasticity and recovery, porosity, wrinkle resistance, washability and dry cleanability; (2) providing a means for up-grading fibers in the waste or other category which is considered unsuitable for spinning into yarn; and (3) possibly providing the means of converting fiber into fabric at a reduced cost per yard.

These various factors affect the selection of non-woven equipment and also the type of use to which the end product is to be put. New and diverse styling effects are important in making fabrics for the apparel trades. In this case the need for up-grading waste fibers or the necessity for keeping costs to a minimum are not deciding considerations. Fabric for the apparel trade is not necessarily made of waste but of virgin fiber of all types and at costs which are equal to those of the spinning mills. The reduction in cost per yard is not a great factor in the manufacture of goods for the apparel trade in view of the additional finishing which must be applied to the fabric and also the fact that, in general, the production line must be run at reduced speeds to make the type of quality fabric necessary.

The heavy emphasis in non-woven fabrics which go into filtration and plastics coating trades is placed on the performance factor inherent in the goods. A filter fabric must have uniform fiber distribution and permit equal pressure drop in all directions. The fabrics must also resist tearing

and have properties which prevent disintegration when wet. The backing fabrics which are used in the vinyl coating trades must be uniform in thickness and have enough strength to support itself through the processing range. The non-woven fabric's binder must also be compatible with the coating material. Another factor important in this use is a means for up-grading fibers which are not suitable for spinning. Some of the lower grades of man-made fibers, though unsuitable for spinning, are nevertheless virgin fibers with the cleanliness and strength properties of regular grade stock.

A use which combines all three of the previously mentioned factors which are advantages of non-woven fabrics is the wiping cloth field. Use of waste or off-grade staple, performance and lowered costs are all important in this field. As a general rule the wiping cloth fabrics are run at far greater speeds than other more quality-demanding fabrics. Web uniformity features are not too strictly enforced in this area due to the disposable nature of the product. The selection of binding agents is subject to greater latitude, of course, due to the nature of the end use. Strength is not a critical characteristic which is subject to a great deal of close scrutiny.

In view of these facts, it would appear that the selection of equipment for a range or fitting an existing range to particular end-uses is largely a matter of choice in most respects. There are several advantages or factors of importance which are naturally inherent to any range and there are also several factors of importance which must be considered in each type of fabric. The important features of each must be weighed and balanced in finding the best product to be made on each individual range.

### Knowledge Of Opening Essential

Harmon B. Riehl, vice-president in charge of sales, Proctor & Schwartz Inc., which makes machinery used in non-woven manufacture, in talking of selecting from the various types of equipment used said, "Whichever final arrangement is used, it is important that the proper preparation of the fiber be made before making a bonded web. This preparation is of vital importance for obtaining uni-

## Non-Woven Textiles

formity of the final product, as this uniformity is impossible unless all of the fiber bundles are well separated into the individual fibers." He thus points out that opening of the fiber, prior to introduction into the range, is of great importance to the attainment of the most desirable uniformity in the resultant product.

This fact, by itself, would seem to give the manufacturer who has had experience with cotton or synthetic spinning operations an advantage in the mechanical phase of the production of non-wovens. The proper blending and opening of raw stock is no simple feat and, in fact, is actually one of the easiest processes to misunderstand in the entire textile field. Fiber bundles must be properly opened prior to entrance into web-forming devices of existing types. If this is not accomplished in the opening and blending stage, it will not be done because single carding or garnetting does not have the ability to open raw stock. The bundles of fiber are, in fact, more tightly entangled and show up in the form of lumps in the web. The lumps, to one degree or another, cause the web and thus the fabric to have a cloudy appearance which cannot be corrected. "The proper preparation," Mr. Riehl says, "usually requires pre-carding or garnetting. Garnett machines and metallic clothed cards have been found best for these purposes." The web forming apparatus for carded webs or air laid webs cannot deliver the fiber more evenly than the material was fed.

### Various Types Of Ranges

There are many and varied types of ranges being utilized in making non-wovens. This is also true in the woven and knitted fabrics fields. Scores of different types and modifications of looms and knitting machines are necessary to make all of the textile fabrics now in use. Of the many different types and modifications of non-woven ranges, none is correct for all applications but each has its own particular characteristics which make it most advantageous for some applications.

A warning sounded by more than one leader in the non-woven business is that, as D. V. Probasco, Lantuck sales department, Wellington Sears Co., puts it, "Perhaps the most important phase of styling is that of avoiding misapplications." He is also quick to point out that "non-woven structures, when properly used, do a more than satisfactory job. However, they are far from the answer to every problem and must not be construed as such." These ideas follow along sensible lines which are made more obvious by the realization that a print cloth could not be used satisfactorily in a shoulder pad, a jacquard weave would not be reasonably applied to a use as a shoe plumper cloth, a combed lawn fabric would not make an economical replacement for tobacco cloth, and a sport denim is not an adequate replacement for gabardine. Just as logically, no one non-woven fabric is applicable to all end-uses.

The varying end-use requirements bring on varying machinery and equipment designs. This is not to say that there is not a measure of overlapping in end-use and equipment design. However, this is also true in woven textiles. A group or line of cards is satisfactory for the production of such items as disposable wiping cloths, some casket liners, shoe shine cloths, etc., etc. The speed factor is much

in this range's favor. The card in a conventional textile operation operates with a cylinder speed of around 160 revolutions per minute and a doffer speed of perhaps ten revolutions per minute. A 27-inch diameter doffer would thus have a surface speed of over 23 yards per minute. In a hypothetical line of six cards running approximately 15 to 18 pounds per hour at this surface speed, plus the additional weight of the binder, a satisfactory cloth for these uses could be made. While the weight and speed conditions are good in these cases, the line would be hard put to produce a fabric with the thickness required in a use such as that necessary for fabric in the automotive trades. The manufacture of these goods would require equipment of different types producing a web of different character.

Many concerns active in the manufacture of non-woven fabrics have designed their own equipment simply because there was nothing suitable on the market at the time. For example, Chicopee Mfg. Co., has a patent on a machine for producing an isotropic non-woven web through use of an air stream. A. B. Dick Co. has a patent on a method of dispersing fibers in enclosed air streams and collecting them in interfilled layers for forming bonded non-woven fiber webs by means of a combing drum and centrifugal forces. West Point Mfg. Co., has a patent on the making of non-wovens from a carded fiber and air forming the web on a moving screen. There are many other patents covering the adaptation of new techniques too numerous to mention.

### Garnetts And Woolen Cards

Garnetts and woolen cards have a seeming advantage over cotton cards because they can deliver greater poundage in wider widths and are more versatile in that they can handle a greater variety of fiber descriptions with satisfactory uniformity and less parallelization of fibers so as to step up the transverse strength of the web. Production rates will vary with the type of fiber, weight and quality of web and speeds. It is not unusual for woolen cards to produce webs of satisfactory quality at 150 pounds per hour. Garnetts may operate at twice this rate. However, the initial machine costs run considerably higher than with cotton cards. The wide web as produced on a garnett or woolen card may be slit at the doffer into two or more equal widths and delivered one upon the other without cross laying, as a single composite sheet.

A controlled air doff for collecting a uniform random light weight fiber is shown in the sketch (Fig. 1). The fiber from a garnett or woolen type card (A) is doffed by air suction at the constricted throat of duct (B) and uniformly deposited on the condenser (C) from which it is conveyed to suitable compression and bonding equipment. Shown also is an arrangement for bonding the mat when thermoplastic fibers are present. The mat is initially

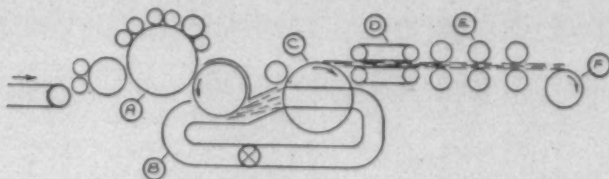
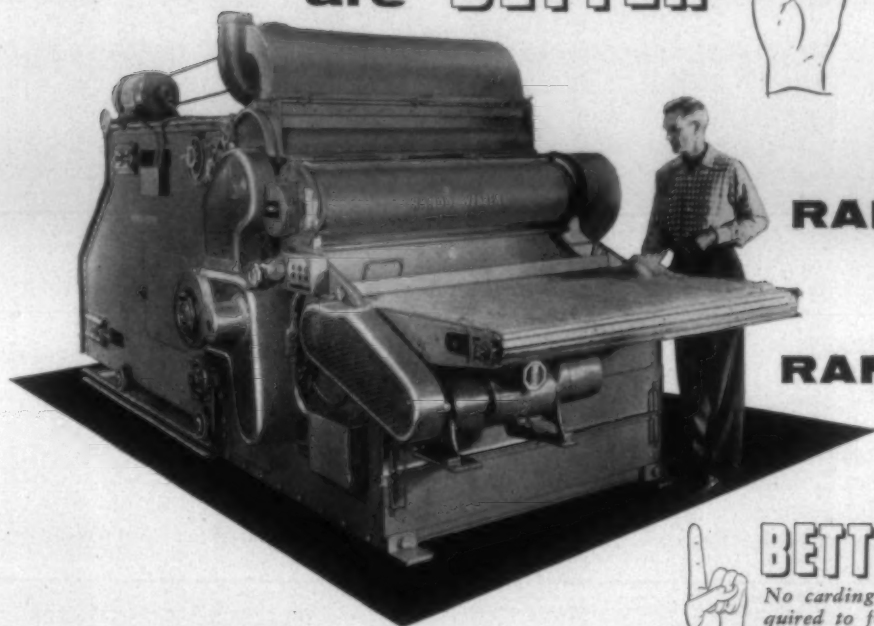


Fig. 1—A controlled air doff which consists of: (A) garnett or cotton card; (B) air suction duct; (C) condenser; (D) compression area; and (E) calender rolls. The device is used for collecting a uniform random weight web.

# Non-woven fabrics

are **BETTER**  **4-WAYS**



made on

**RANDO-FEEDER®**

and

**RANDO-WEBBER®**



**BETTER** Equipment

No carding, garnetting or lapping equipment is required to form the RANDO-WEB. Only one pair of machines—RANDO-FEEDER and RANDO-WEBBER—is needed to make non-oriented webs. These efficient, low-maintenance machines are shipped assembled in 40", 60" and 84" widths.



**BETTER** Production Time

The versatile RANDO-FEEDER and RANDO-WEBBER produce webs of desired thickness. Production range (40" machine) is from approximately 30 to over 300 pounds per hour. Finished webs can be wet or dry bonded, dyed or printed like woven goods.



**BETTER** and Wider Range of Engineered Fabrics

A wide variety of fibers, natural and synthetic, blends, and waste, can be made into a RANDO-WEB. It is remarkable what uniform webs, lengthwise and crosswise, these machines make using staple fibers, processing and recovered wastes.



**BETTER** Finished Products

The RANDO-WEBS produced are suitable for further processing into felts, waddings, heavy mats and engineered non-woven fabrics. Fabrics, filters, surgical goods, wiping cloths and many other products are now being commercially produced.

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## Non-Woven Textiles

lightly compressed at (D) preparatory to entering the calenders (E), the temperature and pressure on each set of rolls being individually controlled with maximum temperature on the intermediate set and pressure, or roll clearance, of the last set adjusted to control the final thickness of the fabric.

### Binder Application Requirements Vary

The same varying requirements and equipment needed to fill these requirements hold true for the bonding and drying phases in non-woven production. Shoe shine cloths are impregnated with print rolls which leave the binder in only certain lines across the width of the fabric. When dried the bound fiber forms a distinct mark and the unbound fiber is fluffed up producing a napped appearance. These unbound fibers do the shining when in use polishing shoes. The other portion of the fabric simply serves to hold it together. Goods for the automotive trades are spray bound in some cases. The method employs conventional sprayers working back and forth across the width of the web passing beneath. The binder is blown by the force of air into the web and is dried without being squeezed or pressured in any manner thus allowing the fabric to be quite plump and light. This type of product is placed between sheets of vinyl plastic and sealed by electrical means. Application of the binder is also done by running the web into a tank containing the binding liquor. The web, of course, must be supported on or by a screen of some sort while in the tank. The excess liquor is either squeezed off or removed by vacuum extraction before entrance into the drying and curing area. Interlinings, filters, reinforcing fabrics and a host of other products are made in this manner or by an equally effective manner employing squeeze rolls set in the horizontal or vertical plane. Bonding with thermoplastic fibers is still another practical method in use.

### Double Screen Saturator

The Rodney Hunt Machine Co., Orange, Mass., introduced a double screen saturator to the trade a little over a year ago. The machine, as its name implies, makes use of two stainless steel woven wire screens, one supporting the web, the other positively holding it down as it travels through the binding liquor. In this way, positive control of the web is obtained throughout the saturating stage and web distortion is eliminated, even at high speeds.

The two screens also convey the web through the exit squeeze rolls, again to prevent web distortion at this point. The squeeze rolls are loaded pneumatically and covered with a soft density Neoprene to permit the binder to flow into the screen interstices, thus insuring optimum extraction. An added advantage of carrying the screens through the nip is to secure good release of the web at this point. Past experience has shown that the saturated web does not strip easily from smooth rolls.

Special guided assemblies, one for each screen, assure even tracking, and separate take-up units provide both horizontal and vertical adjustment of each screen independently. A shallow saturator pan is employed to conserve costly binder solution. A transverse feed pipe is employed for even distribution. This pan, together with drain chutes and collector tank under the screens, may be made remov-

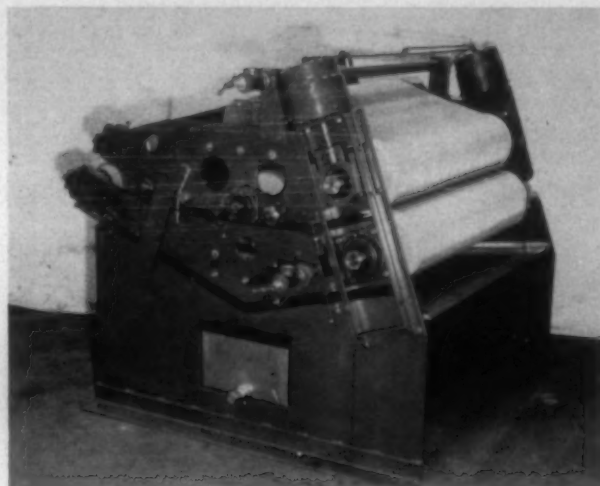


Fig. 2—The Rodney Hunt Saturator is shown here. This 40-inch machine squeezes the excess bonding agent from the saturated web as it passes from left to right through the nip of the delivery rolls. The web is supported by the screens at all times preventing distortion of the structure as it is impregnated.

able for easy cleaning. Shower pipes are provided to aid in cleaning the screens.

To permit easy removal and replacement of the screens, which must be considered expendable, the machine is built on the cantilever principle. All rolls and cross-members are supported from the fixed or drive side of the machine, so that it is a relatively simple matter to replace the endless screens. The saturator is currently offered in five standard sizes; 20, 40 and 60-inch (web widths) machines are already in production; 84 and 96-inch units are on the drawing boards.

### DeVilbiss Spray Unit

Automatic spray machines, made by the DeVilbiss Co., Toledo, Ohio, are employed in some instances for bonding web structures. Fig. 5 shows one of the units supported by a horizontal beam which would straddle the conveyor apron carrying the web. The spray gun mounting moves back and forth across the width of the web. Spans from 36 inches to 96 inches are available from the company.

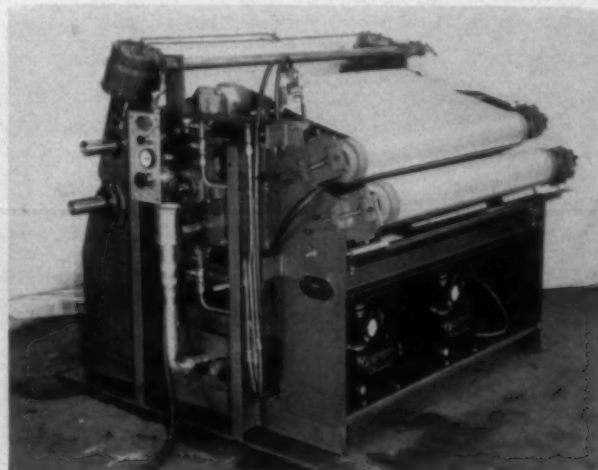


Fig. 3—This is a rear view of the Rodney Hunt Saturator. Material flow would be from right to left as the machine is shown here. A feeler for the guider assembly assures even tracking of the screens.

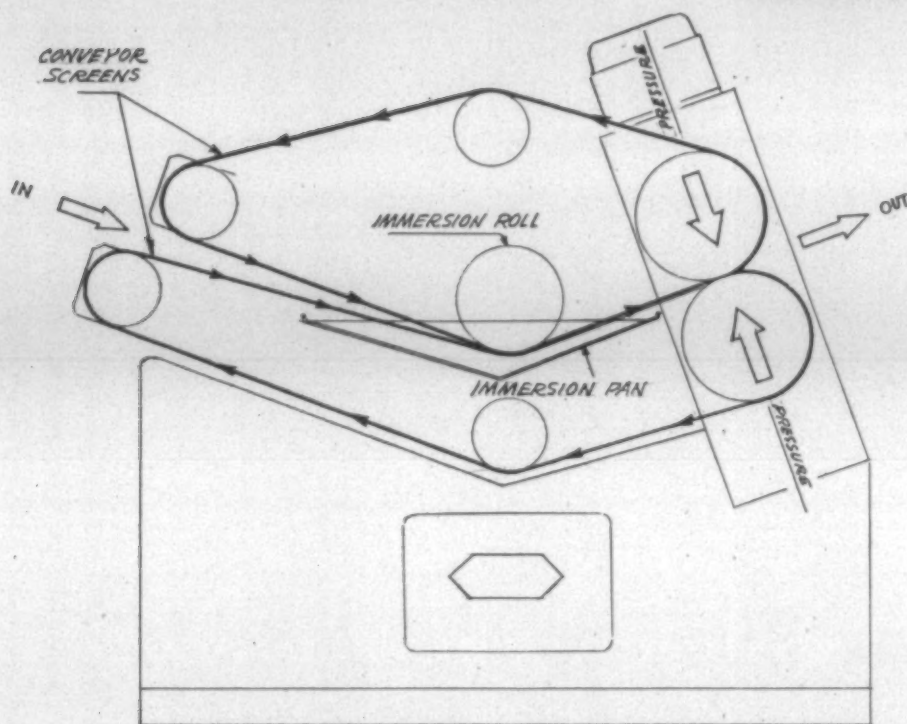


Fig. 4—This schematic cross-section of the Hunt saturator shows the direction of travel of the two screens as well as the location of the pressure rolls and immersion pan. One advantage to the system is the shallow immersion pan which improves the economy of the operation in short runs or when sampling work is being done.

As many as four spray nozzles may be mounted on the carriage. The speed of the conveyor is governed by the amount of binder desired on the web. The spray gun mounting travels at a constant 88 feet per minute. The over-all width of the unit is approximately 42½ inches greater than the stroke of the sprayer. It is driven by a ¼-horsepower motor which is totally enclosed. There is a wide selection of air caps and fluid tips for these guns.

Due to the fact that the guns are of large capacity and are spraying in a relatively close area, a water wash type spray booth is necessary. Air is brought past the guns and over the work to the exhaust chamber unit where it is thoroughly scrubbed and freed of particles of binder before being discharged to the outside. This type exhaust system is the most economical to install and the easiest to maintain and requires the least amount of floor space. Each system must be specially designed to meet the requirements of the particular installation and material to be sprayed.

#### Turn Key Job

A "turn key" job on the installation of non-woven fabric processing is offered by the J. O. Ross Engineering Co., Atlanta, Ga., and its affiliate divisions, John Waldron Corp., New Brunswick, N. J.; and Andrews & Goodrich Co., Boston, Mass. Combined efforts of the three companies are used in conjunction with either a carded or randomized web preparatory operation. The unit is furnished with an impregnator, with latex recovery system; drying and curing oven; and complete drives.

J. O. Ross, along with Andrews & Goodrich, furnishes the drying and curing ovens. Numerous installations have been made with both steam and direct fired gas for the

drying and curing phase. The Waldron Corp. has built and field tested impregnating machinery. The principle of this unit, as described by a company spokesman, involves the use of either two wire screens or one screen and a perforated steel drum. The screen holds the weak unbonded web against the perforated drum as it passes into the binding liquor. The adhesive may penetrate the web without distorting the fiber orientation. The excess liquor may be removed by passing the web between squeeze rolls or vacuum extraction. The disadvantage in roll removal is that the bonding liquor accumulates at the roll nip, particularly at higher processing speeds, and washes or destroys the fiber uniformity. After extraction, the web is transferred to a

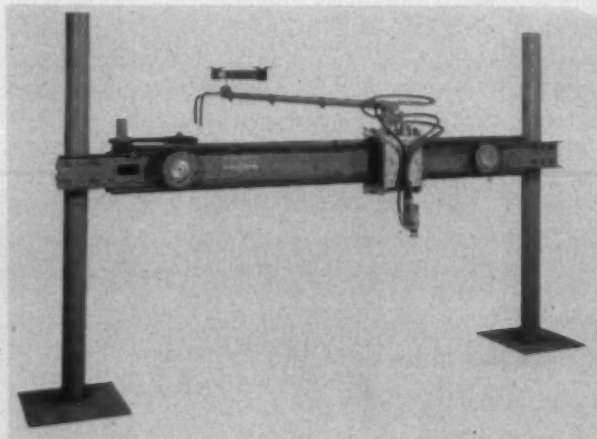


Fig. 5—This device is used to spray the bonding agent onto the web. It is the product of the DeVilbiss Co., Toledo, Ohio. The spray heads move at predetermined speeds in a direction perpendicular to the travel of the web.

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separate conveyor and then through the drying oven. The unit may be built so that the impregnating screen returns through a scrubber or washer to maintain cleanliness.

There are several drying methods including steam cans, hot air drying ovens, infrared heating elements and others. All of these methods for web forming, impregnation and drying are important and effective for various types of fabrics. It cannot be said that any particular one method is best for all applications. Here again it is largely a matter of choice in selecting the correct equipment to do a specific job or, if the equipment is already installed, choosing the correct product to be run. It may also be said that just as there is no one correct way to make the fabric, there is no simple way to make the fabric. There have always been problems involved in every stage of manufacture of textiles and it is obvious that there will always be problems encountered in the manufacture of non-wovens.

The finishing of non-woven fabrics has become, in recent

times, more important. The previously mentioned manufacturing methods may be said to produce a greige fabric. The bulk of the development work done on this phase of the textile industry has been consumed on manufacturing equipment and methods. These methods are more or less firmly established and, in the words of Mr. Probasco, "the finishing of the non-woven fabric is beginning to be a major factor." He continues in the same vein saying, "proper utilization of non-woven structures depends to a large degree on proper finishing methods yet to be developed."

Judging from the list of end-uses which range from tea bags to the outside walls of railway freight cars, 50 of which are reported to be currently in use on the German Federal Railways, the non-woven field is wide open. However, it may be well to point out that engaging in the manufacture of non-wovens is not the place for the organization which has a very limited amount of working capital. It is a vital, vibrant and virile field pregnant with possibilities for tremendous success; but also lined with pitfalls. It is not the place for the man with a timid heart.

## Latex Binders For Non-Wovens

This article explains such terms as monomer and polymerization and shows that the various finishes and hands of non-woven fabrics are not due to black magic but, instead, are due to proper application of materials to achieve specific desired results. The article tells the antecedents of many different types of latexes and, by example, shows the method of formulation to produce particular fabrics. Various latex producers are listed at the end of the article. Many of the producers aided in the writing of this story and special thanks are extended to The Dow Chemical Co. for its help.

**L**ATEXES are the binders used in the manufacture of bonded fabrics. An understanding of the physical nature of latexes is important to their proper use. A definition of a latex begins with mention of another substance, a monomer. Monomers are substances which are made up of molecules having the ability to link or bond with other molecules and thus form giant long-chain molecules. These latter are called polymers and have extremely high molecular weight and unique physical properties. When two different monomers are similarly linked together, the resulting compound is known as a copolymer. A latex, most simply, is tiny polymer or copolymer particles dispersed in water.

The process of latex polymerization is much more complicated than the 1-2-3 step just related. In addition to the monomers themselves, latex polymerization employs emulsifiers, catalysts, modifiers, short stoppers or terminators, antioxidants and stabilizers. Because the monomer (or monomers) is the material having the greatest effect on the characteristics of the finished latex, that latex usually derives its name from the monomer(s) employed.

Commonly known monomers used in the manufacture of the principal commercial latexes are butadiene, chloroprene, styrene, acrylonitrile, vinyl chloride, vinylidene chloride, vinyl acetate and acrylic esters. All of these monomers are normally liquid except vinyl chloride and butadiene which are handled under pressure to keep them in the liquid state during phases of processing. All of these products are derived from materials which are very basic in nature such as coal, petroleum, salt, water and air.

### Styrene/Butadiene Copolymer

The basic materials used in the production of styrene and butadiene are petroleum, natural gas or coal. Styrene monomer is produced by the alkylation of benzene from which ethyl benzene is derived. Ethyl benzene is then catalytically dehydrogenated, meaning to get rid of the hydrogen, to produce the styrene monomer. Butadiene is obtainable from natural gas or petroleum refining by-products, or by cracking certain hydrocarbon fractions by the separation of normal butane fractions for dehydrogenation. The styrene and butadiene monomers are then copolymerized to produce a number of different types of latexes and resins. These copolymers have an extreme range of properties, from soft to hard, and with varying degrees of tack. They are tough, durable and are compatible with many resins and modifiers. The range of properties is directly related to the proportion of styrene polymerized with butadiene, with styrene contributing hardness and butadiene contributing softness.

### Vinyl Chloride Polymers & Copolymers

The vinyl chloride monomer is made by the simple addition of hydrochloric acid to acetylene. Acetylene is obtained from calcium carbide which, in turn, is produced from coal or coke. Hydrochloric acid is a combination of hydrogen, obtained from water or natural gas, and chlorine, which is a product of sodium chloride, commonly known as salt. The

vinyl chloride monomer is polymerized with itself or copolymerized with vinylidene chloride, vinyl acetate, acrylic esters, etc., to form another family of latexes and resins. Properties such as chemical resistance, extreme toughness and resistance to heat and light degradation are inherent to these latexes and resins.

#### Acrylonitrile Copolymers

A combination of hydrogen cyanide gas and acetylene or ethylene oxide produces the acrylonitrile monomer. The hydrogen cyanide gas is made by combining methane and ammonia which are obtained from natural gas and air, respectively. As seen before, acetylene is obtained from calcium carbide which is derived from either coal or coke. Polymerization of acrylonitrile and butadiene make various types of nitrile latexes depending on the proportions of the monomers. The acrylonitrile copolymers are noted for their excellent resistance to hydrocarbons and solvents (dry cleaning) and their good binding and adhesive properties.

#### Acrylic Esters

This group includes acrylate and methacrylate esters. The acrylate esters are produced by two processes. In one, acetylene, carbon monoxide and an alcohol are the raw materials, and in the other ethylene cyanohydrin (derived from ethylene oxide and hydrogen cyanide) and an alcohol. The methacrylate esters are produced from acetone cyanohydrin (from acetone and hydrogen cyanide) and an alcohol. The monomer or monomers then are polymerized or copolymerized in an aqueous medium to yield emulsions containing 25 to 50 per cent solids. Acrylic emulsion films vary from

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very soft to extremely hard and tough. They are characterized by unusual clarity, stability to light and aging and resistance to water and solvent.

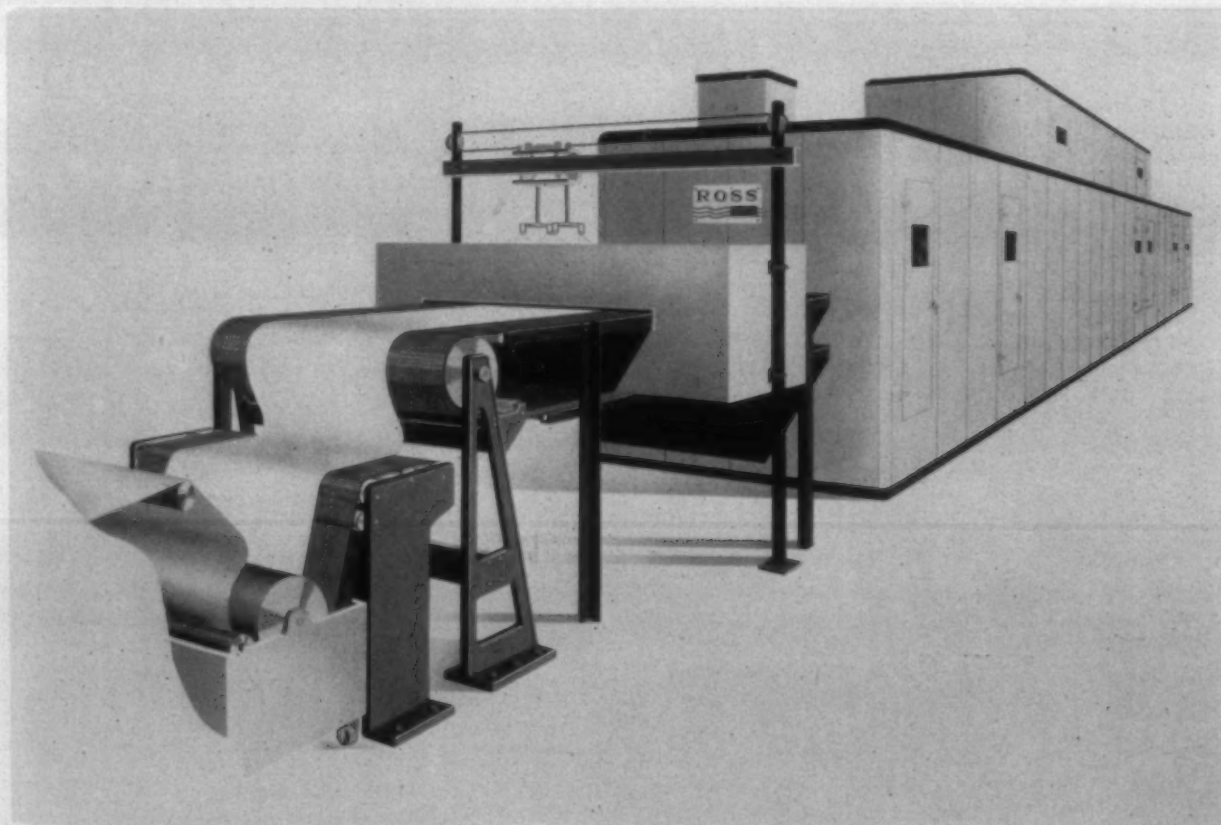
#### Vinyl Acetate & Chloroprene

The addition of acetic acid anhydride to acetylene produces another basic monomer which is known as vinyl acetate. Vinyl acetate is polymerized to form the polyvinyl acetate family of latexes. Acetylene may also be reacted catalytically with itself to produce vinyl acetylene. When this material is reacted with hydrochloric acid, the product is chloroprene. The chloroprene monomer is polymerized with itself and with small amounts of other monomers to give a series of Neoprene rubber latexes. Resistance to ozone, good chemical and solvent resistance, and good binding properties typify the Neoprene series of latexes.

#### Bonding With Polymers

Bonding with polymers is responsible for the successful manufacture of non-woven fabrics. In the ideal sense, the compound should act to form a flexible bond at points where fibers touch one another. If the bond is not flexible a boardy, stiff product with poor tearing strength will result.

The non-woven web, prior to bonding, is quite weak. Bonding may be accomplished by any of three mechanisms: saturation (impregnation), spraying or printing. After application of the latex binder, a drying or curing step is necessary to obtain full benefit of the binder. The composi-



This is an artist's conception of the equipment line as provided by the J. O. Ross Engineering Co., Atlanta, Ga. The web, traveling from left to right, goes through the saturator, the spraying attachment and the two-zone, gas-fired oven.

## Non-Woven Textiles

tion of the binder has great significance in the appearance and performance of the fabric. A major reason for the success of bonded web is a result of the ability to engineer fabrics to end-use specifications. The compounding latitude offered by the various polymer and copolymer latexes available to the manufacturer is largely responsible for this success.

A sample non-woven fabric formulation is reproduced below to provide an example of compounding to obtain specific properties.

### NON-WOVEN FABRIC BINDER FORMULA

Chemigum Latex 235 CHS	100
Zinc Oxide	5
Sulfur	1
Zetax	1.5
Titanium Dioxide	5
Aerotex M-3	25
Accelerator MX	10
Buffer DCY	1
Paraplex G-25	30

Chemigum Latex 235 CHS is an acrylnitrile which was chosen in this case because it has an excellent solvent resistance and adhesion to the fibers. Zetax is an accelerator which is used to make the cure react faster. In addition to the curing system the compound contains a water soluble melamine resin and the accelerator that it requires.

The melamine resin alone will undergo a curing type

reaction with the rubber polymer. Its use in this formulation is really three-fold; (1) to give a tighter cure and greater solvent resistance than is obtained with the conventional cure; (2) to improve the adhesion of the nitrile polymer to the fibers; and (3) to improve the light resistance of the nitrile polymer. However, in adding these materials to the formula, attempting to improve adhesion, solvent resistance and light-aging, the finished fabric has been appreciably stiffened. Paraplex G-25 is added to regain the softness or suppleness required. This product is a polymeric plasticizer which has excellent light-aging characteristics and is non-migrating which means that it will not tend to congregate on the fabric surfaces during the drying phase of the operation.

The sample formulation includes products made by the following companies: Chemigum Latex, Goodyear Chemical Division; Aerotex M-3, Accelerator M X and Buffer DCY, The American Cyanamid Co.; Paraplex G-25, Rohm & Haas; and Zetax, R. T. Vanderbilt Co. Inc.

Other typical binder applications would include the two which appear below. The polyvinyl acetate products (Vinrez) incorporated in these formulations are used in many instances in binding cellulosic fibers.

Formulation No. 1	Formulation No. 2
72% water	72% Water
2% Polyvinyl alcohol	23% Vinrez 3R-58
21% Vinrez 202	5% Texrez F
5% Texrez F	

Formulation No. 1 would find application where a relatively strong bonding effect is required on a relatively stiff

### A PARTIAL LIST OF MANUFACTURED LATEXES

Product	Type	Manufacturer
Butaprene SL	Styrene/Butadiene	Borden
Butaprene NF, NL, NI, NXM	Acrylonitrile	Borden
Polyco 289, 369, 497, 505, 507	Vinyl Acetate	Borden
Polyco 446	Vinyl Chloride	Borden
Experimental Latex X-580.6	Polystyrene	Dow Chemical
Dow Latexes 512-K, 512-R, 513-K, 762-W, 762-K, 762-L, 529-K	Styrene/Butadiene	Dow Chemical
Dow Latex 744-B	Vinyl Chloride	Dow Chemical
Experimental Latex X-2700	Polyvinyl Chloride	Dow Chemical
Saran Latexes F122, A-15, F122-A-20	Vinylidene Chloride	Dow Chemical
Neoprene 571, 842-A, 601-A, 735, 572	Chloroprene	E. I. du Pont
Elvacet 80-900, 81-900, 83-1200	Vinyl Acetate	E. I. du Pont
Geon 576	Polyvinyl Chloride	Goodrich
Geon 352, 653, 251	Vinyl Chloride	Goodrich
Hycar 1551, 1552, 1562, 1561, 1512	Acrylonitrile	Goodrich
Pliolite 2000, 2001, 2076, 2101, 2104, 101-A, 102, 160, 165, 170, 150	Styrene/Butadiene	Goodyear
Chemigum 235 CHS, 236, 245, 245 CHS, 246, 247, 200	Acrylonitrile	Goodyear
Pliovic 300	Vinyl Chloride	Goodyear
Emulsion M, R	Polystyrene	Koppers
Dylex K-500, 600, 700, 800, 900	Styrene/Butadiene	Koppers
Lustrex 620, 630	Polystyrene	Monsanto
Kralac 2714, 2724	Styrene/Butadiene	Naugatuck
Naugatex 2000, 2001	Styrene/Butadiene	Naugatuck
Nitrex 2612	Acrylonitrile	Naugatuck
Rhoplex B-15, B-50, AC-33, WN-9, FRN, WN-80, WN-75	Acrylic Ester	Rohm & Haas

fabric. Formulation No. 2 is one where a softer hand and greater degree of flexibility is obtained by use of Vinrez 3R-58, an internally plasticized vinyl acetate copolymer. In both formulations the modified urea formaldehyde resin (Texrez F) is used to enhance the washing and dry cleaning characteristics of the fabric. Vinrez and Texrez are products of Stein, Hall & Co. Inc.

#### Prevents Migration

A compounding technique has been developed which is designed to prevent migration of the latex saturant during drying. In such compounds when the saturated base reaches a critical temperature (about 170° F.) during its drying phase; the latex becomes coagulated, changing from a fluid to a solid. This coagulation step fixes the location of the binder and prevents its following the water to the surface of the non-woven fabric during the evaporating or drying step. Such techniques increase internal bonding and reduce surface friction from elastomeric binders. In fact, water may be squeezed out after coagulation to speed the ultimate drying time.

These are just a few of the thousands of possibilities which can be found in compounding combinations of binding ingredients. Various blends of fiber, types of fiber and amounts of fiber are also used in meeting the specific applications of the non-woven fabric. A basic fiber must be found to meet the specification. Then a basic type of binder and binder formulation must be reached. After completing these operations, the weight of the web and various adjustments in the binder formulation are necessary before find-

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ing the correct combination to meet the end-use requirement. There are many methods of arriving at these finalized results. However, they are substantially a matter of trial and error and require fastidious record keeping during the experimentation period. The affect of the addition or subtraction of a substance to the binding liquor must be carefully charted in every separate test run.

#### Latexes In Use

There are reported to be over 200 rubber or resin polymers and modifications made in latex form. This is no surprising in view of the fact that there are at least 15 chemical types of synthetic latexes in addition to natural rubber latex. This long list of tongue twisters includes butadiene/styrene, butadiene/acrylonitrile, polybutadiene, polystyrene, Neoprene, acrylic polymers, polyamides, polyesters, fluorocarbon polymers, vinyl acetals, vinyl chloride polymers, vinyl esters, vinyl pyridine polymers, vinylidene chloride polymers and rubber/plastic blends.

These products are, of course, known by the different trade names of the various chemical manufacturers. It has been estimated that butadiene/styrene types, both resin and rubber, supply the needs for more than 50 per cent of all latex applications. Polyvinyl acetate is used in approximately 25 per cent of all latex applications. The acrylic polymers, Neoprene, nitrile and vinyl chloride, each fill about five per cent of the many latex requirements. These estimates include not only bonded applications but also the many other uses of synthetic latexes.

**What fiber properties  
are best suited for specific**

## Non-Woven Applications?

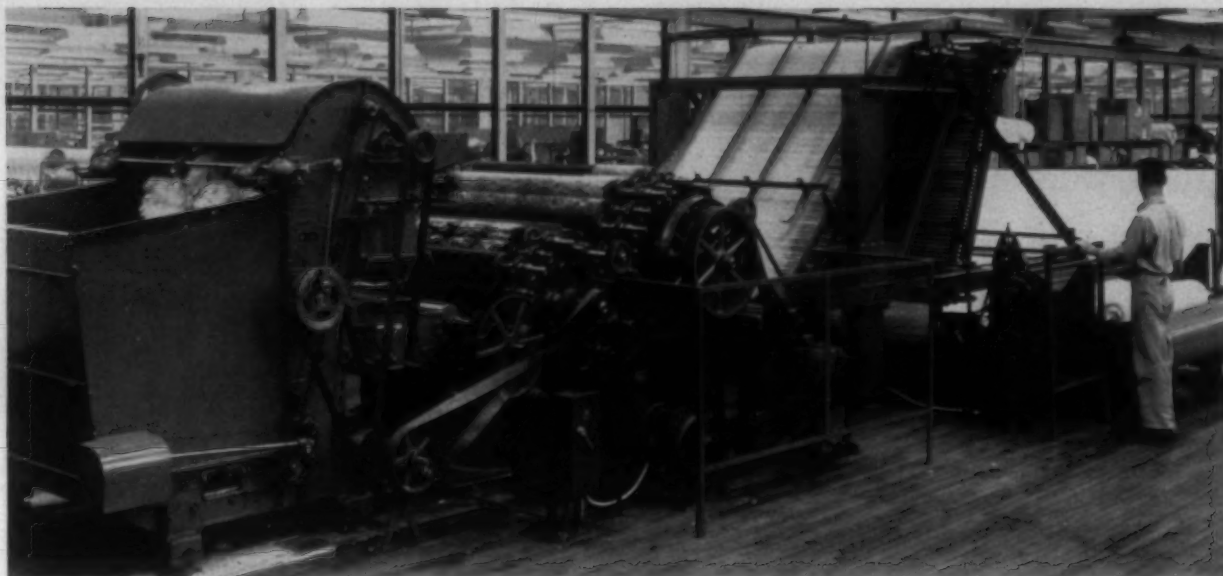
**This article explains how the different characteristics of various types of fibers are utilized in manufacturing non-woven fabrics. Specific uses for particular fibers as well as the reasons for the fiber's suitability are also told by men of outstanding caliber with two fiber producing companies.**

**D**URING recent years, the field of non-woven fabrics has evolved toward new application spheres which require performance based on the ability to deliver specialized services better than any other available products. Fibers used in non-woven manufacturing will vary according to the end use of the product being manufactured. Originally, cotton and wool were the two predominant fibers used for non-wovens. Their use was prompted by the availability of equipment for processing. Drawbacks in their use was readily apparent. Wool fabrics were expensive and had shrinkage characteristics which were objectionable. Cotton entailed much cleaning prior to web formation and in many

instances did not give the strength or quality for the intended use.

With the introduction of the man-made fibers into the non-woven field, a greater number of fiber properties and characteristics were made available. Fibers which could be engineered to specific consumer uses were on hand. Wendall E. Brennan, textile research department, American Viscose Corp., said that "with rayon staple, for example, many features could be offered which would help to engineer a non-woven fabric for a particular end use. It can be purchased in deniers ranging from 0.75 denier to 50 denier, including 3.0, 5.5, 8.0 and 15.0 and, if necessary, various deniers in between." He pointed out that this allows a freedom of fiber texture. Rayon staple in lengths from 1 1/8 to seven inches, is also available in crimp to promote bulk, web cohesion and strength in the finished mat. These fibers can also be dull, extra dull or bright as the occasion demands, he said.

Natural fibers do not provide this versatility in fiber characteristics. For example, Mr. Brennan said that the backing for vinyl film in side wall paneling in automobiles



Garnett and crosslapping arrangement used by the technical and textile department, American Viscose Corp., Marcus Hook, Pa., in conjunction with many other pieces of equipment in the investigation and experimental production of non-woven fabrics, battings and felt of various blends and characteristics.

requires a non-woven fabric which is light in weight but resilient and having a finished strength after bonding sufficient for lamination to a vinyl film. A coarse 15-denier rayon fiber was used in combination with the crimp to provide the necessary bulk and matt strength. Rayon, because of its price and the fact that it could be engineered, served the purpose very well.

In speaking of acetate, Dr. Reiner G. Stoll, director,

applications and product development, Celanese Corp. of America, Charlotte, N. C., said that "the major characteristic which directs utilization of this fiber is the inherent low cost factor demanded of the industry." He pointed out that other factors include dimensional stability, thermoplasticity and a low swelling property. The quality of intermediate moisture absorbency required for such non-woven applications as air and liquid filter materials is



This non-woven fabric range is located at the Celanese Corp. of America, Charlotte, N. C. The fibers move from the Rando-Feeder and Rando-Webber at the left through a DeVilbiss spray range and are then dried and cured by an infra-red unit.

important. Another factor for consideration is the mildew resistance property.

Dr. Stoll says that because of technical problems involving the development of bonding materials, and bonding and finishing techniques (to name a few) it appears that during the next five years non-wovens will not significantly replace woven fabrics or make further strides in the apparel field. The time limitation is provided with additional significance by the possibility of the development of novel production techniques and an important new type of equipment for the formation of the non-woven web. Such mechanical developments could dictate non-woven production from fiber in tow form rather than staple. Should this be the case, Dr. Stoll says, modified non-woven products with improved fabric characteristics and economic advantages could result. Dr. Stoll prophesies that "Despite the hurdles within the five year period, garments of satisfactory hand and wearing quality will be produced in the laboratory."

### Blanket-Comforter

One non-woven application now under consideration is a blanket-comforter type product which might be produced in one continuous process. It would be heat set, electronically quilted and sealed with acetate fabric. The blanket and comforter trade now accounts for a substantial amount of staple poundage each year. Decorative draperies which retain their loft may well be significant, according to Dr. Stoll, in their contribution of heat and sound insulation properties. This is prompted by the current trend toward the use of glass in modern architecture leading to greater drapery wall applications.

Another use to which Dr. Stoll points is structural base materials with a fibrous type base. "Dry (non-woven) process constructions are found desirable," he said, "in a number of applications, including acoustical insulation and honey comb structures, instead of wet process paper-type constructions." The capital investment for manufacture of non-woven materials of this type are a fraction of the cost of wet paper making process manufacturing equipment.

Other synthetic fibers are lending considerable credence to the idea that future non-wovens will be vastly improved. Nylon staple has much to offer because of its high abrasion resistance qualities, its high strength features and its hydrophobic properties. It is being used quite extensively for engineering non-woven products both in 100 per cent form and in blends with cotton, rayon and/or acetate to provide these features to the finished web. Dacron, a polyester fiber, has aesthetic qualities to offer in a finished web especially if short length fibers are used. It can also be used as a binder fiber because of its ability to be plasticized. Where Dacron is used both as a binder as well as a base fiber, it provides a better bond than when used with other base fibers.

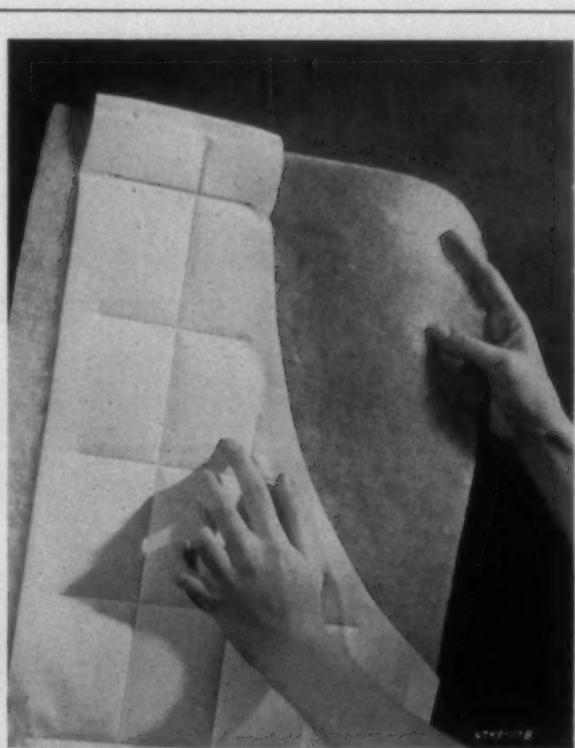
### Thermoplastic Fibers

Vinyon, a thermoplastic vinyl resin fiber with a low melting point, is used as a binder fiber in blends with acetate, rayon, cotton, wool, jute, etc., and other synthetic fibers. Other blend fibers which have achieved a degree of importance are plasticized acetate and the acrylic fibers. The only drawback to glass fibers becoming important in the non-woven field is that they cannot be made to process on textile

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equipment in normal form. With the addition of special finishes or crimp this obstacle can be partially overcome.

Unfolding the non-woven potential will, of necessity, be a slow process. It must be guided by a great deal of research and development not only in technical production and application but also in market evaluation. Waste fibers and reprocessed fibers, at first, served as the main body of the non-woven industry. Although they are currently being utilized today in substantial poundage, there is a steady growth in the use of first grade fibers because of the demand for quality non-wovens. By using first grade fibers, woven fabrics can more nearly be duplicated and improved upon, especially in the lighter weight constructions.

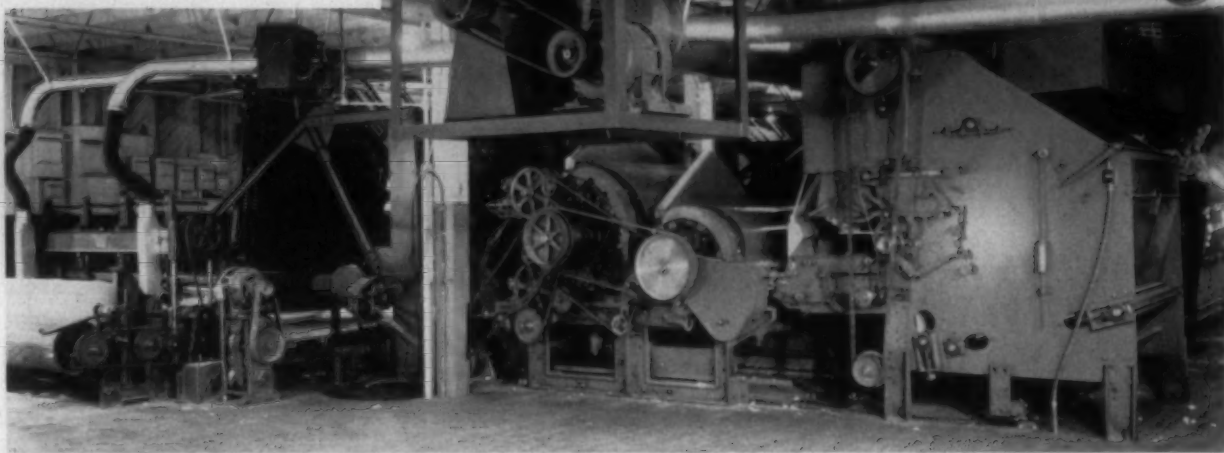


PLIOVIC LATEX 300 currently is being used in non-woven binder systems by Sackner Products Inc., Grand Rapids, Mich., in the manufacture of Safoam non-woven fabrics for use in the automotive industry as door panel padding. Produced by the chemical division of the Goodyear Tire & Rubber Co., the binding agent is an aqueous dispersion of vinyl chloride copolymer made with a high solids content by modern emulsion polymerization techniques. The latex is compounded to impart adhesions, flexibility and softness to binder systems.

Sackner utilizes a random web formation in the production of non-woven fabrics. Through this technique, webs are formed with complete lack of fiber parallelism. Following web formation, the binder is spray-applied to form a smooth, porous and uniform mat ready for drying operations. Chief advantage of random web type non-wovens is excellent multi-directional strength. According to Sackner, Pliovic latex 300 was selected for the application because it exhibits excellent compatibility and stability in binder systems, lowers production costs and provides required strength characteristics. Major use of Safoam is padding for automobile door paneling. The non-woven is dielectrically bonded to fiberboard panels to assure a complete and uniform seal and exhibits necessary strength, resilience and dimensional stability for such applications. Sackner non-wovens are available in widths up to 60 inches and can be colored.

## Non-Woven Textiles

Fig. 1—An automatic batt making system made by Proctor & Schwartz, Philadelphia, Pa., features a batt splitter at the winding head.



## Non-Woven Textile Battings

Produced on the same type of web forming equipment as other non-woven products, textile battings have enjoyed considerable growth in recent times. Methods of manufacture and end uses are explained in this article which also tells of some ways for preparing the product for the consumer.

THE battings market is one which is not too well known but is a market which has a tremendous annual consumption, estimated at in excess of 150,000,000 pounds per year, and good future expansion possibilities. The great bulk of the products of the battings trade goes into mattresses which are estimated to use approximately 80 million pounds annually. Another 12 million pounds of battings are annually sent into the electronic quiltings field. These battings find themselves in a market which is comparatively new and, until a few years ago, this use was only a spark of someone's imagination. Any item that is lined or has a direct need for bulk is subject to becoming within the sphere of the battings market. Ladies' housecoats, jackets for all ages and both sexes, snowsuits, comforts, sleeping bags, pillows and many others are big users of the batting producer's end product.

Textile battings are, of course, not non-woven fabrics. There are some similarities in appearance and the two products are produced on substantially the same types of carding equipment. Bonding is not the important problem with battings that it is with the non-wovens. Naturally, since the batting is used as a layer between two pieces or sheets of stronger material, strength is not a great problem.

### Web Forming

The battings trade normally uses the garnett as a web forming device. The number of garnetts in a line would depend on the poundage desired and quite possibly only one garnett would be needed. The fiber is placed in the garnett feeder hopper and processed through the equipment in a conventional fashion. The web produced is, most often, very cloudy and not well oriented. The degree of orientation is, however, a factor which must be considered for specific end uses and in these cases the web may be transported by lattice-aprons or other means to a cross-laying machine. At the cross-lay the garnett web is lapped back and forth across a slatted apron which is traveling in a horizontal plane at right angles to the lapper and at a speed which is dictated by the weight desired for the batting. The width of the web produced by the cross-lay is determined by the throw of the device which laps the web on the slatted apron.

For applications which require greater orientation of the fiber in the web, a line of conventional cards, either flat or roller top, may be used. This arrangement is quite extensively used for making non-wovens. Obviously, mechanical breakdowns are more frequent on a line of, for instance, six machines than on a line which has only one piece of web forming equipment. Surface speeds, feeding rates and the speed of the take-away conveyor must be closely controlled in this system.

Non-oriented webs are preferred for many applications particularly where considerable flexibility is desired. These web structures may be formed with the controlled air-borne fiber process such as found in The Curlator Corp.'s Rando-

Webber. The fibers found in a web formed by this equipment are entirely randomized; that is, the fibers lie in every direction and are equally divided in number between the various directions. The fibers are fed into a hopper employing special principles and are selected by air to form a uniform feed mat in the air bridge of the Rando-Feeder. This uniform feed mat then is continuously introduced into the Rando-Webber where it is subject to the action of a special high-speed lickering. The fibers are caused to be air borne in a high speed air stream to the surface of a rotating condenser at which point they are aerodynamically woven into a uniform web. This is done according to the pressure drop in the web being formed. A web is produced with balanced strength in all directions with some third dimensional strength. The web flows from this machine in a uniform structure having square edges while the air passes through the condenser and is recirculated through the closed system by internal fans. This enclosed air system contains a built-in humidifier which aids in the control of static conditions. A schematic diagram of the equipment is shown in Fig. 2. This method of web formation produces a quality non-oriented web as the entire thickness is built in one pass eliminating the necessity of cross laying.

#### Preparation Of Product For User

A soft type of light paper has been used, for the most part in preparing the batting for the user. The paper is placed on both sides of the batting for handling purposes and is discarded after the batting is put into the finished product. In recent times a most promising development has been spray bonding techniques which impart enough strength to the batting to eliminate the use of paper. Vinyl resins or latexes are applied, in light proportions, after web formation by use of heads which are similar to conventional paint sprayers. In products which are made of acetate fiber,

## Non-Woven Textiles

the spray solution is a plasticizer which is a softening and bonding agent for acetate. An example of this process is the Celanese Corp.'s Quilticel.

Howard E. Shearer, textile research department, American Viscose Corp., points out that when the product is to be used in the electronic quilting trade, one of the most attractive combinations to the automotive industry has been a coarse denier crimped viscose staple blended with a thermoplastic vinyl resin fiber, known as Vinyon. The Vinyon not only adds resilience and body to the mat but also acts as a bonding agent and promotes a strong electronic seal to the vinyl sheeting.

A cheaper, less effective, though frequently used method employs a mixture of polyvinyl chloride and/or polyvinyl acetate as a bonding agent when the product is to be used in the quilting trade. The light film of resin melts readily when in the electronic quilting apparatus. When cooled, the resin remains in the state into which it was imprinted by the quilter. The polyvinyl chloride is highly compatible with the vinyl sheet or sheets to which the batting was quilted.

Another method for bonding battings is through the use of powdered resin. A powdered resin, perhaps of the melamine or related type, is sprinkled on the batting as it is formed or after it has been formed. After compression the batting is passed through a heating device which may be either infrared lamps or a hot air oven. The resinous powder is brought up to its melting point and then allowed to cool, thus forming a bound batting. The resin sets while the batting is still in a compressed condition unless the end product is desired to be resilient with low density. Either of the heating devices mentioned above may serve as adequate drying methods for sprayed battings.

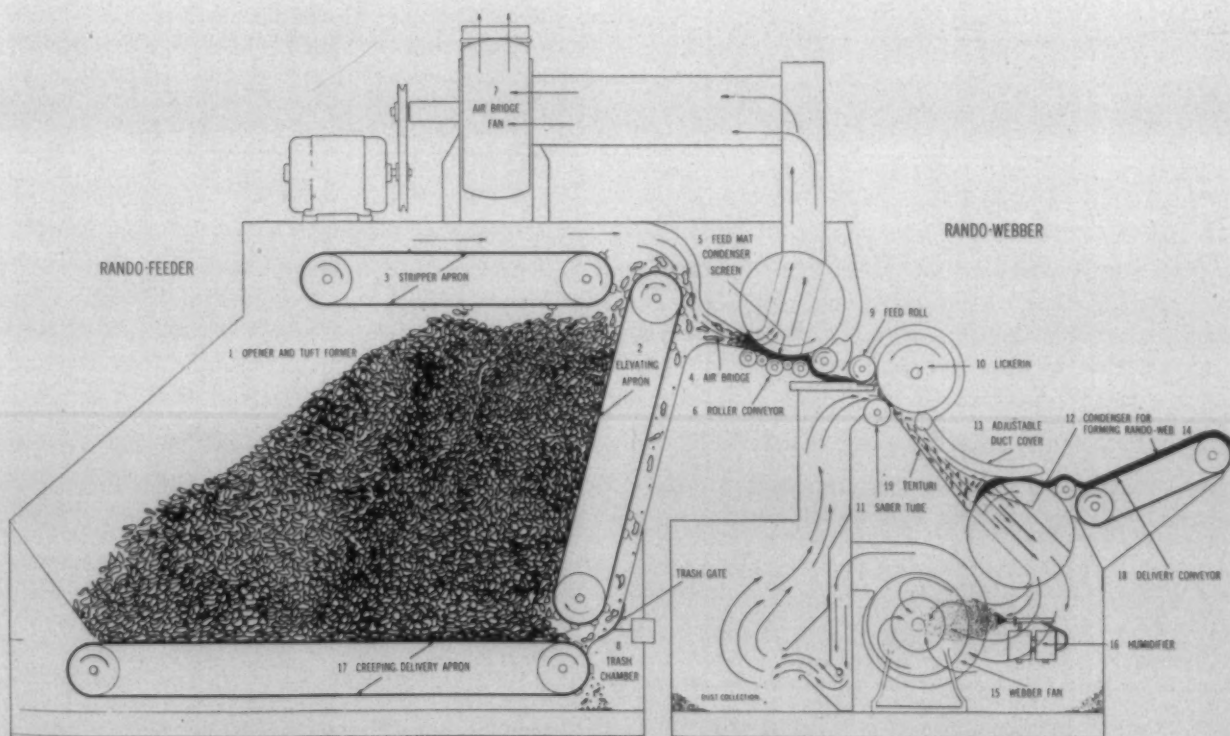


Fig. 2—A schematic diagram of the Curlator Corp.'s Rando-Feeder and Rando-Webber.

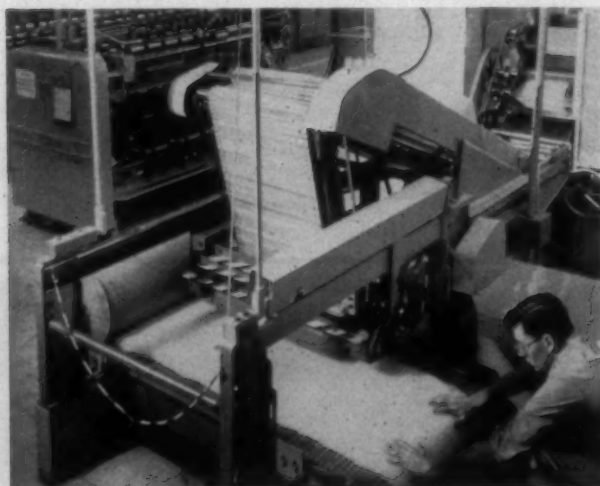
# Non-Woven Textile Felts

By H. G. LAUTERBACH, Textile Fibers Department, The Du Pont Co.

In this article the author tells of the steps taken by the industrial products research laboratory of the Du Pont Co. in making felts from fibers other than wool. The properties of wool which allow it to felt are explained as well as the methods used to impart these characteristics to a batt of man-made fiber. Methods of making various grades of felts and some end uses of the product are also covered.

THE solution of a classical problem of long standing in the fiber field—how to make felts from man-made fibers—has been reported on by the industrial products research laboratory of the Du Pont Co. The initial step in this work is to actually isolate and define the problem. Down through the ages the manufacture of felts from wool and other animal fur has remained largely unchanged. The procedure of rubbing or matting the fiber in the presence of moisture and heat has been adhered to and modern technology has only served to improve the productivity and precision of the operation.

Wool felt is made by first subjecting a carded batt, collected in open width, to hardening where it is processed into a sort of fabric by rubbing in the presence of steam. This hardened batt is then fed into fulling machines or mills and subjected to the pounding action of hammers until the desired density and degree of cohesion is achieved. With some slight modifications, fur fibers are felted in the same manner. Fur and wool are the only fibers which have been found to work in this process. They have certain properties which makes this possible.



Carded web is laid upon itself by the cross-lapper to form a batt of any desired thickness and density. This is the basic material for non-woven fabrics. Web made in this manner is also applicable for uses such as in pillow stuffing and upholstered furniture. The equipment is part of Du Pont's new industrial products research laboratory located at Newport, Del.

Wool felt is a grouping or sheet of fibers which is laid out with uniformity and may have practically any weight, density and hardness. This sheet of fibers, while it is flexible, has considerable strength which is equal in all directions. The fibers in the sheet are entangled in such a prolific manner as to make delamination resistance quite high. Resistance to delamination has been one of the most difficult properties to obtain in making felt-like materials from fibers other than wool or fur by conventional resin bonding methods. This deficiency usually is caused by the tendency of the bonding agent to migrate to the surfaces of the material during drying or by inadequate dispersion of the bonding agent throughout the batt.

Wool and fur felts have some severe limitations on their usefulness in industrial applications which off-set their good properties to some degree. It cannot be used in applications which include a rubbing action in the presence of moisture because, obviously, the felting process would continue and the action would change the properties of the material. In addition, use of felt in the presence of certain chemicals also changes the properties of the material. The strength of felt, while considerable, is limited and its resistance to abrasion, mildew and fungi is not desirable. In view of these facts the reasons why a felt material made of man-made fibers would find ready markets are clear.

## What Fiber Properties Cause Felting

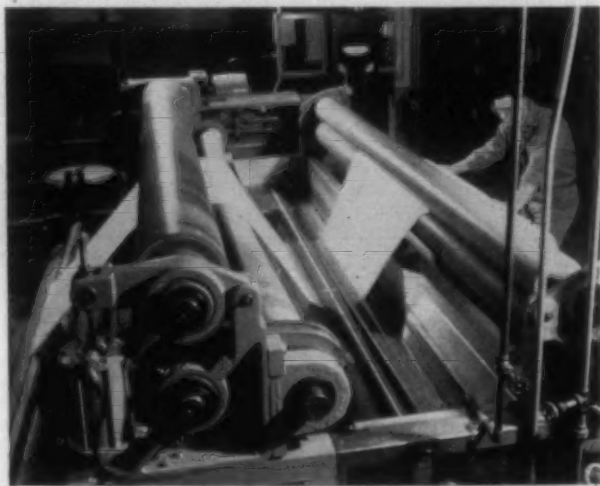
The problem and objective of the research work on felts are defined as discovering which properties of wool fibers are responsible for felting and then utilization of these findings in making felts from man-made fibers. The man-made fiber felts should be free of the limitations of wool felts retaining all of wool felt's good characteristics.

Examination of wool and fur fibers under magnification shows that these fibers are not smooth as are man-made fibers. The wool and fur have scales which are directional. Wool's properties which are reported to be important to the felting process are crimp, curl, scales, ease of extension, recovery from extension and differential frictional coefficient. It is known that initial entanglement followed by compacting causes felting. Therefore, the properties which are responsible for this action are subject to a review.

## Study Of Entanglement And Compacting

In studying entanglement, the researchers placed a group of fibers between two glass plates on the stage of a microscope. The fibers were subjected to a rubbing action while under such observation. A ready entanglement was noted, particularly when the fibers are moistened. The deduction from this observation is that the natural elasticity of wool fiber is the property which causes the entangling. This method of observation is used in determining whether other fibers have the same capacity. Fibers such as Dacron polyester fiber and Orlon acrylic fiber do not show a capacity to entangle while rubber filaments are seen to behave

in much the same manner as wool. These facts make it obvious that felting is caused by the rubber-like elasticity of the wool fibers. The elasticity is characterized as being high elongation and high recovery from relatively large strains.



Shrinking by chemical action or heat is the final step in production of non-woven felts made of synthetic fibers. The batt enters the machine at the right and emerges at the left. The density, hardness and other properties of felt can be varied by controlled changes in processing.

Compacting, the other contributor to the felting process, is reported to be achieved by the movement of individual fibers past one another in such a way as to decrease the area of the batt without an accompanying change in denier. The researchers associated this action with the directional fiber surface scales and the directional frictional coefficient. The amount of movement of fibers is the determining factor in the grade of felt.

### Taking Stock Of Results

It has thus been found that felting is achieved by two principle actions which are the elasticity of the fiber and its ability to compact. The two properties are extremely difficult, if not impossible to build into a single man-made fiber. Felts made from polyethylene fiber, which has high elasticity and recovery, cannot be compacted sufficiently due to the lack of the scaly surface found on wool. Man-made fiber felts, made on the wool felt process, cannot be controlled in density and hardness for this reason. Rather than tailor a synthetic fiber to meet the requirements it became apparent to the researchers that a more logical approach would be to tailor a felting process to the existing properties of man-made fibers.

The first consideration, the entanglement or hardening step, may be achieved by means other than rubbing in the presence of moisture. One of the more efficient means of doing this job is passing a carded batt of fiber through a needle-punching machine. This machine consists of a bank of barbed needles set in a reciprocating head. The head moves up and down as the fiber batt passes beneath. The needles pass through the web and on the return trip the barbs pick up fibers on the opposite side and bring them to the surface of the batt. Entanglement is brought about by mechanical means in this manner.

The laboratory work which was done on the other con-

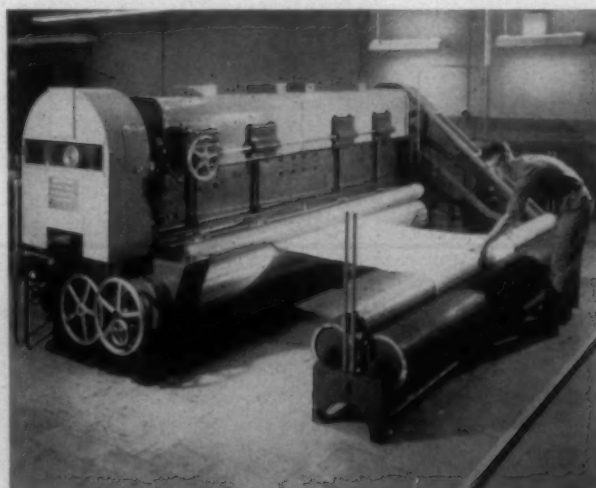
## Non-Woven Textiles

sideration, the compacting associated with fulling of wool felts, showed that this was accompanied by a decrease in area of the felt by an area shrinkage not by a change in denier. In other words, the fiber remains the same size. Man-made fibers can be produced with inherent shrinkage. When prepared by various special methods and then exposed to moisture, chemicals or heat such fibers shrink by increasing in denier and by decreasing in actual end-to-end length. It is logical then, that when induced in an entangled mass of fibers, shrinkage of the individual fiber will result also in shrinkage in area of the mass and thus compact the whole structure. In addition, once the fibers have been exposed to shrinking conditions they are stable to further shrinkage. Man-made fiber felts are made by exposing needle-punched batts to these shrinkage conditions.

### Various Grades Of Felts

Various grades of man-made fiber felts are made by adjusting the amount of needle-punching and the shrinking conditions. Strength and abrasion characteristics are readily changed by varying the amounts of needle-punching. Since the felt product is immune from further shrinkage after the initial process is completed it is possible to use them in dynamic applications which would destroy wool felts. Man-made fiber felts are also capable of high resistance to chemicals, mildew and fungi. They may also be washed and cleaned easily.

A variety of mechanical uses is developing for the high performance felts in the wicking, sealing, lubricating, cushioning and polishing fields with emphasis on high temperature applications. This type of felt promises to become a new material of construction. In addition, uses in the apparel field are also a distinct possibility. Felts manufactured to precision specifications from man-made fibers are made by a continuous process which is actually simpler and faster than the wool felting process. Among the manufacturers of these felts are Troy Blanket Mills and American Felt Co. Felts made from Dacron, Orlon and Teflon tetrafluoroethylene fiber are commercially available.



This machine which performs the needling operation in which fibers are mechanically bonded is located at the Du Pont Co.'s new industrial products research laboratory at Newport, Del. Batts up to 132 inches can be processed on the machine which has 8,400 needles.

# Non-Woven Fabrics and their Place in the Textile Industry

By WILLIAM M. KLOTHE, Pellon Corp., New York, N. Y.

This paper, which was delivered at the Polytechnic Institute of Brooklyn earlier this year, describes the family of fabrics made by the Pellon Corp. and details some of the end uses of the products. The article tells why non-wovens are better than woven fabrics when engineered for specific applications and says that they are unconventional only to the extent that they actually perform as superlatively as the company claims. A stumbling block is noted in that the consumer must be indoctrinated with the fact that non-wovens improve his item rather than act as a means to lower his costs.

**T**HIS presentation is not going to be made along technical lines. We are not going to discuss the various methods of forming and making a web and, subsequently, the web into a bonded, non-woven material. We are not going to discuss the techniques, nor the fibers, nor the machinery involved. We are not going to predict the fantastic future of non-woven fabrics. In essence, we are, instead, going to discuss what Pellon or non-woven fabrics—engineered in various weights and textures—are doing and can do for the apparel and industrial world.

Non-woven fabrics have recently taken on an importance and significance only because we, in the non-woven textile business, have stopped thinking about it as an inferior cheap substitute for other textiles. We have stopped thinking of it as a disposable item and we are now thinking of it as practical textile for apparel and industrial applications. It is only because these new fabrics have done such a superlative job, that the people in industry are becoming more familiar with the term "non-wovens."

Just what are today's non-woven fabrics? How do they perform and why do they perform so efficiently? Now one of the facets of non-wovens that we are not discussing but which usually makes an intriguing headline is "Non-Woven Fabrics—Its Problems and Predictions." We are not crystal ball gazing; we are only concerned with practical factors—the plus values of non-wovens and why they now play a prominent role in the textile world.

## Inherent Problems

We cannot stress and emphasize the problems inherent in the manufacturing of non-woven fabrics because these same problems are a burden to all mills and manufacturers and finishers of conventional fabrics since the inception of their business. We must assume that the conventional manufacturers of conventional textiles, from their raw materials to their spinning to their weaving to their dyeing, have problems after all these many years. It is then safe

to assume that non-woven manufacturers in an entirely new industry will also have their problems. We are not going to dwell on that phase, but on all the excellent qualities inherent in non-woven textiles as they are being manufactured, produced and used in current production.

As for predictions—that too is usually a very simple provocative title to come by. All one has to do is to sit down and think of all the things we would like to see done and then predict that within the next ten years our industry will accomplish them. We will solve all the complicated problems that every industry using textiles presently faces and the remedy will be non-wovens. We will point with pride to the remarkable improvements and advances that have actually taken place. The practical applications are somehow always more exciting to me than some of the fantastic claims that are being made for the future. Talking about the future, it has always been a rather simple matter to claim all the things that are going to happen tomorrow. It is always tomorrow!

## Tomorrows Become Today's

I have learned that tomorrows inevitably become today's and that today's somehow always slip into yesterdays. So the question is not what have we done with non-wovens yesterday or what we hope to do with them tomorrow, but what are we doing with them today. What we have dreamed would happen tomorrow many years ago is now today. We look back to our early yesterdays and the fumbling stages that we went through and we are not surprised that these early shaky beginnings have now produced concrete end results. We will, however, in spite of our earlier statement make one prediction for the future. It is that non-woven fabrics a year from today will be much improved over what we are currently using. I am sure we will be able to make the same prediction for the coming future years.

## Unfettered By Precedent

The non-woven industry is new and vital and is not fettered by past precedents. It is not static and it is very much aware of the challenge it must face. That challenge alone will assure us a bright future. We, at the Pellon Corp., have divided our non-woven fabrics into two categories. One we call the stabilizing group of non-woven textiles and the other we call a multi-directional series. The stabilizing group has stemmed from the original concept of bonding fibers together and in that way making a textile. With the advent of a stabilizing group of non-woven textiles we soon realized that our primary market was the apparel industry and immediately set out to demonstrate how non-wovens performed in the vital areas of garments where shape-retention was a must.

In going into the apparel industry with a stabilizing group of non-woven textiles, we first aimed our sales

at the interfacing areas. We were selling "shape insurance." We discovered that we could make a very light-weight material that was smooth in appearance, isotropic in nature, and when sewn to or between two fabrics, assured permanent shape for that particular section. It, therefore, was merchandised in its early stages as interfacing fabric and when properly applied, gave remarkable stability and shape-retention to these areas. For the apparel trade we had to make a fabric that was washable and dry cleanable and a certain amount of tensile and seam strength was required. All of these standards were in the inherent qualities of our non-woven material. We had educated the manufacturer to the startling fact that our material was isotropic in nature and therefore had no warp or filling direction. It could be cut on any plane and sewn without raveling or distortion. It made, and is making, an excellent interfacing material only because the characteristics of a non-woven material are exactly opposite to those of woven material. We can then—by using non-wovens in conjunction with woven outer fabrics—transmit these characteristics of recovery and stabilization to the woven fabrics. In short, Pellon has not been used as a substitute, but rather as a compatible, new, better tool to perform definite concrete tasks.

We, at our mill and laboratories, have constantly made evaluations of the present woven constructions that are used in the apparel fields and then built our non-woven shape-retaining fabrics to specifications that would outperform the normal conventional woven types in the same areas. We have found that by using Pellon as an interfacing fabric in a raincoat, sportcoat or other men's outerwear, we could stabilize that front to an optimum degree. We find that the manufacturer—by using a non-woven for interfacing fabric—actually gives the operator at the machine a guide for sewing. We find that with the use of this non-woven interfacing, every garment is more uniform in performance; fronts hang straighter; buttonholes are cleaner and there is a minimum of distortion in the front area. The retailers find that these garments are shipped to him from the manufacturer in perfect selling condition. The consumer finds that they travel much better; are subject to considerably less wrinkling and always have a cleaner, fresher appearance.

#### Collar And Cuff Applications

When used in apparel for collar and cuff areas we can supply non-woven fabrics which vary in thickness and

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weight from a minimum of nine mils to 26 mils thick, and in weight from 1.7 ounces per square yard to 5.3 ounces per square yard. To simplify this breakdown of weights and thicknesses, we, therefore, can supply a non-woven product to shirt manufacturers who use a light weight outer fabric or to manufacturers of leather or fur garments where the outer material is usually bulky and heavy in weight. All of the intermediate types of fabric generally found in wearing apparel (from such extremes as jerseys to poplins; silks to wool) can be controlled or shaped with non-woven material to a better extent than can possibly be achieved with any other inner construction textile.

Because non-woven fabrics have no warp or filling, there is minimum distortion in those areas where shape is essential. And because non-woven fabrics are thin and smooth, the edges and seams, normally sewn in four or six thicknesses, are usually flatter and neater in appearance. Because non-woven fabrics have demonstrated time and time again that bulk and weight are not essential to shape insurance (the shaping characteristics are built-in in the structure of non-wovens), we can achieve "shape without weight." All of the thinking in the apparel industries is towards lighter and lighter and lighter clothing. We, at the Pellon Corp., feel that the new light weight non-woven fabrics are truly a new designing tool and open up new horizons to the manufacturing and styling of apparel.

#### Recovery Power

These non-woven fabrics have considerable recovery power. You will notice that we do not use the words crease resistance but emphasize the fact that our materials recover 99.5 per cent of their original shape. The fabrics have made contributions to the designing and construction of the dresses, coats, skirts, sportswear, men's shirts, blouses, men's bowties, raincoats, outer jackets (both in cloth and leather), bathing suits, bras, bridal gowns, drapery headers and all segments of the childrens' apparel field. The categories that have been listed are by no means all of the fields where our stabilizing group of non-wovens has made a contribution for more uniform, better-made, better-wearing, better-looking apparel.

This stabilizing group of fabrics has been extended into the 1200 series of fabrics which have been primarily manufactured for industrial fields. They vary in weight and thickness from fabrics measuring no more than 23 mils

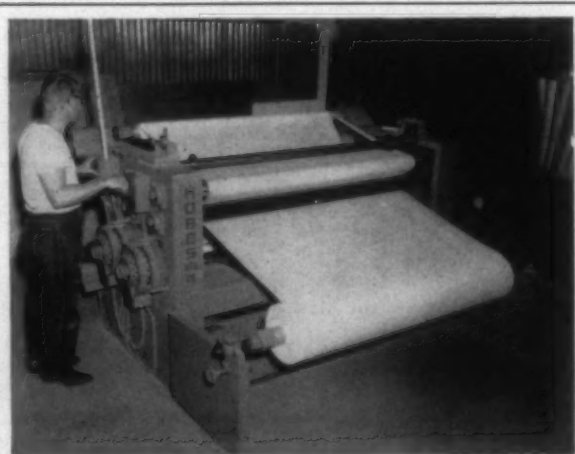
**"There is constant demand for new fabrics which offer better value than either woven or paper products can offer. This will mean new developments in web forming machinery, fiber, bonding agents, finishing equipment and techniques and the availability of these to the industry as a whole. I do believe that if the correct non-woven fabric is engineered for the correct end use and becomes commercially acceptable insofar as performance and price is concerned, more challenges will be thrown up to the non-woven industry."**—Wendall E. Brennan, textile research department, American Viscose Corp.

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in thickness to non-woven fabrics which will measure to 75 and 80 mils. These have found ready acceptance in the shoe field, in the luggage field, in ladies' handbags field, in the men's belt field and in military-type headwear. All of the listed categories depend upon a supporting fabric to give them shape insurance. All luggage, whether leather or plastic, is supported by some type of inner construction. We find that our non-woven fabrics—scientifically engineered to fit a need—do a superlative job of shape insurance with a minimum of weight and a maximum of durability.

### Shoe Trade Uses

The whole new field of flexible women's shoes, which have been advertised and emphasized recently, are made possible by the use of Pellon for inner construction. This new Pellon is being used by shoe production men for box toes, plumpers and innersoles. From one season to another its usage has increased to a fantastic degree. I would like to take the opportunity to emphasize here and now that Pellon, in these categories, has not been used as a substitute for previous materials but has opened up to shoe manufacturers a brand-new conception of styling and production.



**NON-WOVEN FABRICS** are now being slit and rewound automatically at the rate of 220 feet per minute by Hobbs Mfg. Co.'s "engineered" installation at Buresh Nonwovens Inc. of Westfield, Mass. Described as a Hobbs 60-inch Shear Cut Model Slitter and Rewinder, the machine is handling non-woven fabrics in 56 to 58-inch widths. It trims the edges of fabric in process, and will slit up to five strips at a time to any width desired. Material, which varies in thickness from ten-thousandths of an inch up to an inch, is supplied in rolls up to 30 inches in diameter and 500 yards in length. While presently operating at 220 feet per minute, the Hobbs equipment is said to be capable of accurate performance at speeds up to 750 feet per minute.

Elements of the installation include a Hobbs unwind stand for rolls, a slitting assembly, drive rolls, Hobbs-Alquist rewind drive units, main drive and two-cable lock rewind mandrels. The unwind stand will accommodate rolls of 60-inch maximum width, 30-inch maximum diameter on three-inch inside diameter cores. It is equipped with unwind shaft, core chucks, hand adjusted brake and lateral and longitudinal hand adjustments for shifting the parent roll. The slitting assembly is the standard Hobbs Shear type. Drive rolls feed the material through the machine and maintain the proper tension during the trimming and/or slitting. The Hobbs-Alquist rewind drive and the two-cable lock rewind drives accommodate rolls up to 30 inches in diameter on three-inch paper cores.

Where Pellon is used as a filler in men's belts, it gives a suppleness and shape-insurance never before achieved by this industry. In the women's handbag field, we have made a substantial contribution to new designing techniques and styles where shape has not been sacrificed by reducing the weight of the finished bag.

### Resistance Met By Non-Wovens

All of these are examples of what non-woven fabrics, manufactured to individual industry specifications, can do in improving the product. The only resistance that non-wovens have to overcome is not its ability to perform—but its ability to convince the old-line manufacturer that a new inner construction textile, made in a rather unconventional manner, can improve his product. Wherever non-woven fabrics have been used and have been properly engineered and applied, they have invariably improved the products. If I were asked to name the chief stumbling blocks that a non-woven fabric mill must overcome in order to merchandise its product, I would say, first, proper presentation so that we immediately disassociate in the mind of the new potential user that non-woven fabrics are synonymous with paper and, therefore, should be as cheap as paper. Non-woven materials are made of basic everyday fibers such as nylon, cotton, acetate, Dacron, wool, etc. They are unconventional, only in the fact that they are combined or made into a textile other than by felting, knitting or weaving. They are unconventional only to the extent that they actually perform as superlatively as we claim them to perform. Second, the most important thing in merchandising non-woven fabrics is the one word, and that I cannot emphasize too strongly, and that is misapplication. If we can properly indoctrinate the new user to the superlative characteristics of non-woven fabrics as a means of improving his item rather than as a means of cheapening his costs and if we can guide him in its proper application, the end result is invariably superior to any other known shape insuring agent today.

### Trained Men Sent To Field

The Pellon Corp. stresses the fact very strongly that only trained technicians are sent into the field—men who not only know their non-wovens but also the varied and sundry problems of the industries they serve. Non-wovens are manufactured to improve products for the apparel and industrial trade and this goal cannot be achieved unless experts represent this new and exciting segment of the textile world. While we are on the unconventional applications of non-wovens, it will most likely not come as a surprise that up to now the greatest field for non-wovens has always been as a supporting material for plastics. It has not been until recently that a specific new type of construction has been developed by our company to impart characteristics to plastic film which make it more leather-like and a richer, more luxuriant fabric and therefore more saleable. Once again, this is an example of building a new product with new construction techniques for a specific job, an example where the prime importance was appearance and performance rather than cost. We can go on indefinitely about the various things that non-wovens are doing specifically in this particular field.

This brings us to our multi-directional series of non-woven fabrics. In an article that I read sometime ago,

## Non-Woven Textiles

the ultimate goal of non-woven fabrics was to achieve hand, drape and softness that would be comparable to woven fabrics. I think that has always been the goal of everyone of us who are now active in producing non-woven textiles. At the Pellon Corp. our multi-directional series has achieved just that. We can now make the fabrics of varying thicknesses ranging from nine mils to about 45 mils with a roundness of hand, a definite suppleness of loft that achieves a luxurious hand—truly characteristics that very few people have ever associated with non-woven textiles. This multi-directional group of fabrics actually has a bias built-in on a full 360 degree angle and is exactly opposite to our stabilizing group which is on the straight in any direction. Multi-directionals have opened new fields of application heretofore closed to the non-woven textile business.

These fabrics are making wonderful strides in the plastics field, in the women's apparel field, in the shoe field, and in the men's apparel field. We have been able to achieve with this multi-directional non-woven fabric all of the shape-retention inherent and usually associated with non-woven textiles but have completely eliminated some of the harshness and crispness that has usually been associated in those areas where non-woven fabrics have been used as a supporting material. We, therefore, are contributing to the new look in men's clothing which demands a more natural silhouette and lighter construction.

### Compatibility With Light Weight Uses

We find that with the pliable and lofty characteristics associated with this group we can now make superior inner constructions for the chest area that are more compatible with the new light weight outer fabrics, including synthetics and blends, that are being used in the men's apparel field.

We find, too, that these multi-directional non-woven fabrics are making excellent contributions to the men's heavy outerwear apparel field in surcoats and car coats where loftiness in the facing, collar and pocket areas are essential to keep the garment's characteristics compatible with the padded interlining usually used but not contributing additional weight and yet assuring shape retention. So Pellon, in this multi-directional group, has made contributions to the new lighter weight constructions and because of the qualities of loftiness and fullness have also made terrific styling advances in the men's heavier outer apparel field.

You will have to pardon me for continually using the word, multi-directional, but sometimes along the line of

developing a new industry, we must also develop new technical terms to describe these new characteristics. For the want of a better descriptive phrase, we use multi-directional to signify the fact that it is not only bias on a 45 degree plane but directional or bias in a multi-direction.

### A Revolutionary Aspect

The most revolutionary single aspect of this multi-directional fabric has been its contribution as a men's neckwear interfacing material. This is another example of building a specific fabric to meet a specific need rather than as a stop-gap measure usually employed when interfacings are selected. We needed loft to give the outer tie material a fullness of hand. We needed a plump type of fabric so that it would knot well, and we needed characteristics which would then make for full recovery in the knot area. We have been in that field for a little over a year and its acceptance by the manufacturer, retailer and consumer has been most gratifying.

The multi-directional fabric is also ideally suited for inner construction and shape retention purposes in any of the fields that use jerseys or knitted types of material. The non-woven fabric has the same supple characteristics and richness of hand usually associated with these knitted fabrics and yet controls the distortion of the stretch and sag inherent in these materials without changing the richness and fullness of the material itself. These new, soft, full, plump, multi-directional non-woven fabrics are the greatest advance made in our non-woven textile field and it holds a very exciting future. It will be and it is rapidly becoming a major component of the inner construction of the men's apparel fields. It will very definitely contribute to the new, full, soft, round silhouette that is just coming into the women's apparel picture. It is an ideal shape insuring interfacing for men's neckwear; it is ideally compatible with any of the jersey type fabrics and may be the forerunner of what we all hopefully think of as a non-woven outer apparel material.

### Summation

In summing up, I would like to point out the fact that non-wovens are a new designing tool which when used correctly are very effective. Non-wovens are smooth, soft, firm, supple, thick or thin, depending upon the end use for which they have been engineered. May I also point out that non-wovens are light in weight; are washable, and dry cleanable; dry quickly; are wrinkle-resistant to a degree

"Calculations based on the use of cotton cards, six cards per line, indicate that to be a reasonably profitable operation there should be no less than two production lines operating five days per week, three shifts per day. Production equipment would be apt to run around \$100,000 and be capable of producing some 900,000 pounds per year."—Howard E. Shearer, textile research department, American Viscose Corp.

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that cannot possibly be achieved by the normal conventional finishing techniques. These are important performance properties and are recognized by manufacturers, retailers and consumers. Whenever Pellon is used as the non-woven inner lining, textile manufacturers indicate this fact by various methods (labels, handtags). It's the bonus, the dividend that his product gives to retailers and consumers.

They in turn recognize it as the ultimate in product value. It is gratifying to know that a manufacturer—whether it's Dodge in automobiles, or Pioneer in belts, or Jantzen in bathing suits, or Lily of France in brassieres, or Light House in lampshades, or Capezio in women's shoes, or Harris in rainwear—indicates that his products are better on the outside because there's Pellon inside. That is truly an admission that non-woven fabrics have "come into their own."

# Prescription for Textiles: Non-Wovens

By FRANK N. COOPER, Camden Fibre Mills Inc., Philadelphia, Pa.

**In this article the author describes the operations of Camden Fibre Mills and the evolution of its activities in the resin sprayed batings field. The article also shows concern over the fact that the paper industry may take over in non-wovens and calls for a united effort by the textile industry in research and development for future non-woven products.**

HOW often has the textile business been described with the words, "It's a sick industry?" Certainly it is a much misunderstood industry. Indeed, it is terribly weak in the dissemination of information. The man-in-the-street knows considerably more about his automobile, his television set and his power-mower. Yet textiles are more important to him. Every man, woman and child is deeply involved with fabrics and fibers. Their very lives depend on them. This is not true of autos or TV or lawn mowers however glamorous or fashionable these may be.

The public hardly knows the difference between fibers and tradenames; between proper names for traditional fabrics and gimmick word creations destined to live for only a season. Faulty public relations is partially the plight of our industry. And we are all guilty.

In my own business, hardly a year goes by that I don't get a dozen requests for a mattress—wholesale. I'm not in the mattress business, and never have been. The firm I work for manufactures batting. But in the mind of many friends and acquaintances, it's "padding, or mattresses, or something like that." We are not alone in our inept use of information and education. The entire industry suffers a kind of inferiority complex in the field of public relations.

The textile industry is on the threshold of a dynamic new era. Yet we seem most reluctant to enter. A remarkable achievement awaits us, comparable to such strides in other fields as the space satellite, for example. Certainly men will eventually control all of outer-space with rockets; and tame the elements with regulated wind and rainfall. We will live in a world of new materials, not the least important of which will be non-wovens.

The heady promise of non-wovens at the present rate of progress may never be fulfilled by textile firms. Others

may perfect the product long before we do. Our claims and our techniques are in serious need of revised direction. Rapid changes are taking place in the market place. The year 1957 is but a page in the hurried history of the Industrial Revolution. As we are all learning, the impetus for change is research. We're learning it—the hard way—in the batting business.

Our firm was founded shortly after the first World War. The largest users of our cotton "felt" (this is what the users called it) were mattress manufacturers. The balance of our product went to manufacturers of upholstered furniture.

These people found that although the price for cotton batting was slightly higher than the cost of other conventional filling materials, they were better able to figure actual costs by measuring the batting they used rather than stuffing "handfuls" of palm fiber, or moss into the furniture. It is interesting to note, therefore, that this usage constituted our trade until World War II. The tail end of the Second World War was probably the only period in our business history that we didn't need salesmen. Demand was excessive for the first time. Of course, the atmosphere was completely misleading.

In busy laboratories, far removed, research men were perfecting foam rubber. Within a short three years after the war, 75 per cent of our market dwindled away. The savings in labor achieved with foam rubber nearly outmoded cotton batting. I say nearly because furniture manufacturers still use batting. Cotton is a good topper for foam upholstered pieces since it is considerably cooler and since it tends to overcome certain wrinkling effects that can be seen sometimes in foam rubber covered products. Cotton filling materials are generally more comfortable than any substitute yet developed, but unfortunately cotton batting does not lend itself to machine age methods.

However smug the foam rubber industry may feel to have captured the upholstery market, they may themselves have cause to tremble. Rapidly emerging from the test tube, a new and cheaper foam, Polyurethane, seems about to outmode foam rubber for furniture cushioning and padding. But rubber foam or plastic foam—the mattress and upholstery manufacturer only utilizes a fraction of the cotton felt used previously. Were it not for the fact that the

garnett machine is so versatile, our firm would be just so many floors of idle equipment.

Not only will the garnett re-fiberize threads and clippings but also if a lapper, a floor apron plus a winding head is added, the machine will ply-up layer upon layer of fiber batts. Reduce the ply and it will wind a thin web of fiber into a roll of wadding so light that a baby can handle it.

In fact, baby is wearing it—in the form of quilt-lined nylon batting. Today we are meeting our full production quota by turning out millions of yards of light weight (average three ounces per 45-inch wide linear yard) synthetic fiber batting for quilting into snowsuits, outdoor underwear, etc. Garment manufacturers have been quick to note the price advantage and luxury look of quilted interlinings as compared to pile linings. These manufacturers are cashing in on the demand created by the powerful advertising of the man-made fiber producers. The consumer bloc has been indoctrinated with the impulse to own "magic fibers" in their clothing. Of course, as I have indicated earlier, the confusion is rife, the consumer doesn't really know which of these items "dries quickest!" . . . "Wears longest!" . . . "Simply drips dry!" . . . "Is warmer than wool!" Mr. and Mrs. Consumer like hang tags. Evidently, a strong claim, however, inaccurate, seems to temporarily resolve the buyers' confusion.

Our company has been fortunate to produce vast quantities of light-weight synthetic batting for the quilting industry. We have run the gamut of synthetics, nylon, acetate, Dacron, et al for a thousand uses in quilted material. Yet, we feared that from the same source that created the miracle fibers there would come some innovation from the research labs to render quilted interlinings obsolete. This anticipation already seems acutely accurate. A competitive product only in its infancy now is showing up in the form of lofty, strong "batting"—polyurethane foam. This aggressive material is no longer satisfied to simply pad upholstery. It seeks new industries to conquer. Therefore, we decided not to ponder our fate but to make an aggressive venture into natural tangents of our present business. We invested in a plant to make non-wovens.

Our pilot fabrics were made on conventional garnetts. We completed excellent pilot runs. Some of our fabrics seemed perfect for apparel uses and others seemed to have potentiality for industrial purposes. Turning these out in volume was the problem—a problem we never solved. When, for example, the bonding agent we used successfully in trials proved impractical for "mileage," the chemical company that supplied it could offer no suitable replacement.

If the hand of a given piece of goods seemed undesirable, the machinery people were not able to supply apparatus to improve the line. All of the firms with whom we worked

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had previous experience in non-wovens, from mixers to driers, but they were pledged to secrecy in this matter or that. If we supplied our own engineering, they were willing to construct equipment on a "cost-plus" basis. The source for such expense in what might be an endless elimination contest was our batting business—a well that, unfortunately, is not bottomless.

### Too Many Secrets

Our investment in non-wovens was outside of our regular business. It was a separate entity, in a separate plant. The tremendous expense in personnel, and in equipment changes, became an unsupportable drain. Finally, we consigned the equipment to the rubble of history. We had been confronted with too many secrets.

In the present scheme of things, small business which comprises the circulatory system of the industry, is unable to avail itself of sufficient technical information to be carried forward. If it remains for the giants to pioneer, the future of non-wovens may never be the inheritance of the textile industry at all. A clue of this sort was indicated by our next experiment.

Some months after the experiment just described, we entered into a series of discussions with a firm that manufactures equipment for the plastics industry. It was agreed that we would experiment with a certain piece of equipment on the basis of mutual trial and shared expense. Our end product was an embossed non-woven in handsome pastel colors and in a great variety of dimensional (intaglio) designs. This material was, in contrast to our initial experience, made in our own plant and given to our regular sales force for exploitation.

Our salesmen had never handled non-wovens before but they were highly enthusiastic. Unfortunately, their best efforts were to no avail. The fabric was a natural for wall covering or luggage, or lamp shades. Yet it had one glaring defect. Similar patterns, visual effects, and colors were available in paper—plain, ordinary paper . . . at one-eighth the price. Experiment Number Two ended.

Yet, isn't it curious that some of the most ancient axioms are best applicable to current problems? "Perseverance conquers." I'll illustrate: Hardly had we disposed of the equipment for experiment Number Two when we faced a serious challenge in our regular line. Customers were complaining that light-weight batting was so weak that it retarded efficient quilting production. They claimed that our batts frequently broke and that more strength was needed.

This was serious and because it was true it called for immediate attention. Our earlier experience with non-

**"Perhaps the most important phase of styling is that of avoiding misapplications. Non-woven structures, when properly used, do a more than satisfactory job. However, they are far from the answer to every problem and must not be construed as such."—D. V. Probasco, Lantuck Sales Department, Wellington, Sears Co.**

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wovens carried us through. We had an insight into the problem and proceeded to set up a line that would bond batting. Our old experimental notes, once a loss, were now a profit. Today, we manufacture a strong, pliable glazed wadding that is in many ways a fabric—a non-woven fabric.

Of course, we are in the secrecy act, too. We have by no means escaped the malady, the secrecy symptom, of the textile business.

Just as the industry is misunderstood, so is it misunderstood. Traditional textile operations will someday soon be relegated to antiquity. The memories that remain may only be the extravagant claims once seen on hang tags.

### Calls For Co-operation

Now is the time, I think, for serious co-operation. The large weavers, finishers, etc., had best turn to working with their colleagues—the logical choice would be proces-

sors of garnetted batting—and share with them the expense of truly cracking the non-woven fabric barrier.

Many of the secrets, the majority of which are valueless, could be cataloged and then perfected or eliminated. An atmosphere of co-operation typical of research in other more advanced fields must replace the crude secrecy of many valiant, but misinformed, pioneers. You will recall that I described one of our company's non-wovens as being closely resembled by paper. I think of this experience as a kind of sign post whose meaning needs little interpretation. If we do not co-operate in our own problems, perhaps others will solve them for us. The paper industry, perhaps?

Textiles may not only lose their place in history, but in the dictionary as well. With automation already turning the corner, with the many cycles we have weathered, possibly textiles will meet the challenge after all. I, for one, would like to see a great spirit of co-operation-in-research. We must generate a bigness of spirit that will be the advent of a new revolution in textiles. The Industrial Revolution, you may remember from history, started with textiles . . . a most auspicious heritage.

## A Comparison

# England's Progress In The Non-Woven Field

By LEO WALTER, Consulting Engineer

**How are non-wovens progressing in England? To answer this question we asked our correspondent in Britain to survey the field. His report appears here and contains descriptions of conditions and equipment which are, in some instances, similar to those found in the U. S. The article tells of the ways in which non-wovens are being utilized and, in tabular form, fabric specifications.**

**N**ON-WOVEN fabrics, or "bonded" fabrics as they are called in England, have certain characteristics which make them suitable for many uses. The newer and more expensive types of non-woven textiles have points in common with leather and felt but seem to be free from irregularities and other inherent faults of these two substances. Their comparatively low cost to manufacture attracts the attention of textile processors to these materials.

The production of non-woven fabrics can be divided into formation of the web, application of the bonding substance and the finishing operation. Web formation may be produced either by mechanical carding of fibers or by an air-laying process. Parallel laid fabrics made from carded webs have greater strength in machine direction. Greater strength in the direction of the width can be achieved by placing some of the constituent webs at an angle. The usual range of fabrics necessitates the use of several carding machines.

REFERENCE: G. H. Elliott, "Intrinsic Advantages of Bonded Fabrics," *Skinner's Silk and Rayon Record*, Manchester, England, January 1957.

Each card deposits its web on a common lattice conveyor running under them, thus producing a sandwich of several webs in layers.

Air laying methods produce a single layer of homogenous basic web for non-woven fabrics. The Rando-Feeder and Rando-Webber developed by the Curlator Corp., East Rochester, N. Y., is an example of this type. These machines employ the use of the air bridge principal and controlled fiber distribution in the web structure by the aerodynamic wearing of the fibers. This departure from conventional textile machine design, in quality workmanship and in new principles employed in fiber processing permit versatility in the types of fibers which can be processed. Balanced web structures from approximately one-half to 20 ounces per square yard may be produced without rearranging machine settings.

### Web Formation And Bonding

The following factors influence the choice of a particular method of web formation: high tensile strength of a parallel laid fabric in machine direction; good lateral strength and tear resistance of cross laid and random laid fabrics. In addition to these considerations comes the easier tendency of both parallel laid and cross laid fabrics to delaminate in comparison with random laid fabrics.

The main techniques for the bonding of the fibers in a web assembly may be classified as follows: (1) use of thermoplastic fibers; (2) application of synthetic resins; and (3) use of adhesive substances such as natural or synthetic latex.

When using thermoplastic fibers (cellulose acetate or

vinyl types) in the blend with a portion of non-thermo-plastic fibers heat is applied. At the same time pressure may be used. The softening process can be achieved without pressure by using steam or hot air for producing a felt-like soft, thick, bonded material.

Bonding by using viscose is carried out by impregnation methods. First the fibrous web is impregnated with dilute cellulose zanthate solution. This is followed by coagulation treatments and by washing, bleaching and dyeing. Darker shades are usually achieved by dyeing the bonded fabric in the same continuous process of manufacture, during or subsequent to, the washing operation employing direct cotton dyes.

Discontinuous bonding may be carried out using particularly polyvinyl acetate emulsion and applying this by a printing technique in stripes or a particular pattern. This method of production yields a fabric which is not bonded over most of its area and is, consequently, soft and absorbent although less durable than a more fully bonded material. This sort of bonded fiber fabric is used for wrapping sanitary towels and for disposable curtains, napkins, etc.

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The most generally used method of production is that employing the complete bonding of a web with adhesive materials. In this instance, the web is drawn through a bath of the adhesive substance and then either squeezed or extracted before being dried. According to various patents on this subject, the impregnating processes may be repeated two or three times to introduce higher proportions of bonding agents. Although this technique was introduced initially with the use of polyvinyl acetate emulsion as the bonding agent, it has been extended to the use of natural rubber latex and synthetic rubber latices of several types, notably of the butadiene acrylonitrile type. The bonding solution must be compounded to include fillers, vulcanizing agents and accelerators in order that the final product shall have the required properties.

It will be appreciated that in addition to drying the impregnated web to form the bonded fiber fabric, the subsequent step of heating at high temperature in order to vulcanize the rubber or synthetic rubber bonding agent may

TABLE A  
Materials Produced by Bonded Fiber Fabric Ltd., Bridgewater, England

Parallel laid viscose bonded fabrics (38-40 in. wide)		Cross laid viscose bonded fabrics (51 in. wide)	
Type	Weight Oz./Sq. Yd.	Type	Weight Oz./Sq. Yd.
P.75	0.75	X.150 L	1.5
P.100	1.0	X.150 A	1.5
P.150 L	1.5	X.200 A	2.0
P.150 A	1.5	X.250 L	2.5
P.150 F	1.5	X.250 F	2.5
P.200 L	2.0	X.300 F	3.0
P.200 F	2.0	X.400 L	4.0
P.250 A	2.5	X.400 A	4.0
P.300 L	3.0	X.400 F	4.0
P.300 F	3.0	X.600 A	6.0
P.375 F	3.75	X.600 F	6.0

Cross laid rubber bonded fabrics (54-in. wide)			
Type	Weight Oz./Sq. Yd.	Fibre Constituents	Bonding
H.300	3.0	Viscose rayon	Natural rubber
H.400	4.0	" "	
H.500	5.0	" "	
H.600 FR	6.0	" "	
H.1000 FR	10.0	" "	
NHA.300	3.0	Nylon and viscose rayon	Butadiene acrylonitrile and p.v.c. copolymer
NHB.300	3.0	Nylon and viscose rayon	Butadiene acrylonitrile
H.300 Q	3.0	Viscose rayon	p.v.a.

Random laid rubber bonded fabrics (54-in. wide)			
Type	Weight Oz./Sq. Yd.	Fiber Constituents	Bonding
RL.250	2.5	Nylon and viscose rayon	Butadiene acrylonitrile
RL.300	3.0	" " " "	" "
RL.400	4.0	" " " "	" "
RL.1000	10.0	" " " "	" "
RAB.275	2.75	" " " "	" "
RAB.400	4.0	" " " "	" "
RH.300	3.0	Viscose rayon	Natural rubber
RH.400	4.0	" "	" "
RH.500	5.0	" "	" "
RH.300 Q	3.0	" "	p.v.a.

# Non-Woven Textiles

be necessary. Furthermore, particularly for clothing applications, it may be desirable to complete the operation by washing to remove water soluble materials included with the bonding agents.

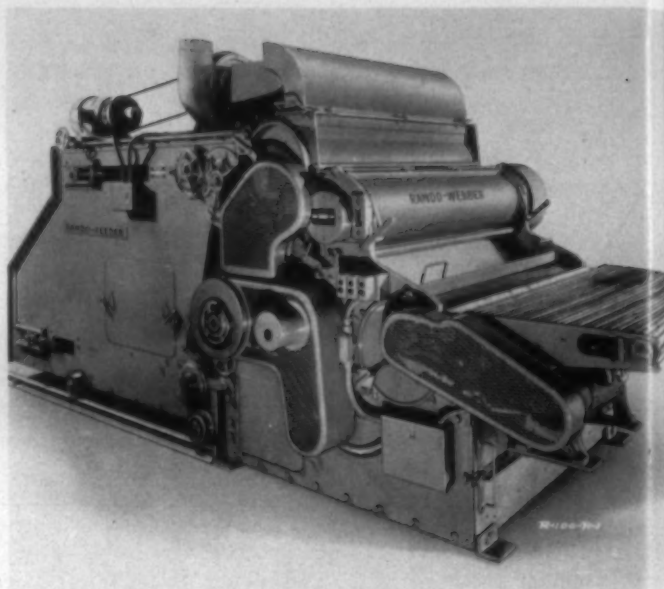
In general, most viscose bonded fabrics are substantially cheaper than the corresponding woven fabrics even though they have many or most of the desirable properties of the woven fabrics which they replace. Furthermore, the viscose bonded fabrics are superior to papers in porosity, stability, tear resistance and wet strength. In considering the applications for viscose bonded fabrics, it is important to note that these will withstand the conditions of most textile finishing operations including dyeing, back filling, calendering and embossing.

## Examples From Production

In Great Britain one of the leading non-woven producers is Bonded Fibre Fabric Ltd., Bridgewater, Somerset, England, which manufactures a comprehensive range of parallel laid and of cross laid viscose bonded fabrics. Fiber constituents are shown in Table A. Licenses have been granted by Carl Freudenberg of Germany and by the West Point Mfg. Co. to the British firm of Bradford Dyers Association, and to Messrs. Tootal, Broadhurst and Lee for production of non-woven fabrics.

Among others, the following uses of non-woven fabrics are reported from Great Britain: for artificial flowers, for wrapping of dry battery cells, bookbinding, in place of calico discs for buffing wheels and wrapping of rubber-covered cables. Other uses are for coffin lining, dental napkins, filtration of liquids, for certain packaging operations and as interlinings.

Non-woven fabrics are also used, in addition to the above, for covering sanitary napkins in place of woven cotton gauze (0.5 to 0.6 oz./yd.). Two types of leather cloths (plastic coated fabrics) have been developed using bonded fiber fabrics as their base. One of these comprises



The Rando-Feeder & Rando-Webber developed by the Curlator Corp., East Rochester, N. Y., is an example of the type of web forming equipment which uses air laying methods to produce a single layer of homogenous basic web for non-woven fabrics.

a polyvinyl chloride sheet, a fibrous wadding of thermoplastic fibers and a backing of bonded fabric made from cotton fibers bonded with plasticized polyvinyl acetate. This composite assembly is combined and embossed by heat treatment to yield an attractive quilted article which is employed particularly in the panelling of side walls of automobiles.

The second type of leathercloth is formed by calendering polyvinyl chloride onto bonded fiber fabric. In this instance, since the purpose is to achieve excellent suppleness and high tear resistance, the bonded fabric includes a high proportion of nylon and is bonded with a synthetic rubber of the butadiene/acrylonitrile type. This second type of leathercloth can also be imitated by the polyvinyl chloride spreading technique. Similar bonded fabrics are used as a base

TABLE B  
Properties of Bonded Fiber Fabrics

Type	Approx. Weight Oz./Sq. Yd.	Thickness <sup>1</sup>	Tensile <sup>2</sup> Strength		Extension <sup>3</sup>		Bursting <sup>4</sup> Strength Lb.
			M.D.	T.D.	M.D.	T.D.	
RL.240	2.4	11-12	22	14	28	50+	54
RAB.275	2.75	12-13	24	13			40
RAB.400	4.0	15-17	38	25	25	45	64
RL.1000	10.0	40-45	72	60			160+
H.300	3.0	13-15	30	17	8-10	16-20	42
H.1000	10.0	25-30	90	60			116
German Fabric							
1	2.7	10-13	11	13	21	40	18
2	4.5	20-23	18	21	17	45	33
American Fabric							
1	2.3	11-15	13	12	23	37	34
2	3.2	19-26	28	27	50	50	67

<sup>1</sup>In thousandths of an inch (measured under a load of 2 lb./sq. in.).

<sup>2</sup>Lbs. per 2-in. strip.

<sup>3</sup>Per cent extension at break.

<sup>4</sup>Measured on Mullen type machine.

"Much of the resistance to non-wovens has been from fear that non-wovens might put looms or knitting equipment out of business. This kind of thinking is short-sighted and lacks an attitude of progress. Generally speaking, non-wovens are not cheap substitutes but are in use because they do the right job when the fabric is tailored, fiber-wise and binder-wise, for a specific use. The non-woven is doing a job that a woven fabric has never done."—Francis M. Buresh, textile consultant.

although by this method the highest potentials of tear resistance and extensibility cannot be developed to the same extent as by the calendering methods.

Corresponding developments have been achieved in Britain, using a very similar type of bonded fabric as is also used in the boot and shoe trade. The bonded fabrics preferred for use as base for leathercloth are those of the RL and RAB series with weight selected according to the strength needed.

In this sort of application, bonded fabrics have definite advantages over woven fabrics and are inevitably cheaper than knitted fabrics which seem to be the only alternative possibility for developing highly extensible leathercloths. The bonded fabrics are also easier to process than knitted fabrics because of stability. The flat surface with absence of yarn structure affords economy in use of coating plastic. Bonded fiber fabric, either alone or in conjunction with the plastic coating, might be viewed as a leather-like substance with leather being a natural non-woven structure in its very best form.

Use of bonded fiber fabrics in clothing is the largest single outlet at present. This use seems potentially, even with a great expansion in output, to continue to be the most important market for these materials. From the extremes of felts to sized waddings, the clothing trade has long been accustomed to using non-woven structures. Some of the earliest bonded fabrics gained ready acceptance in making shoulder pads and in tailors' paddings.

Viscose bonded fabrics, which withstand washing and dry cleaning, are very widely used in making shoulder pads, particularly for the women's trade, and for interlining belts. Another use is in raincoats to give body and stiffness in component parts. By far the most interest is focused upon

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those bonded fabrics which have advantages over woven cloths in the character of resilience. This resilience can be contributed to both by the constituent fibers used and the bonding agents applied during manufacture.

At the present time, Oswilena made in England, Vilene made in Germany (or very recently also in England) and Pellon and Interlon produced in the U. S. include closely comparable fabrics. In similar weights these fabrics differ very little from each other in character, appearance or performance. Properties of several typical fabrics are listed in Table B.

It will be seen from Table B that there are differences in the relationship between the machine direction strength and the transverse strength of particular manufactures. The production of Bonded Fibre Fabric has strengths than competitive

One important  
of results

"In the production of non-wovens, the increasing product specifications. Expanded initiated and maintained by chemical non-woven industry with new and betterment. The cost of development cannot profitable dividends in the future not consumer as well."—John E. Warner, manager, The Goodyear Tire & Rubber Co.

## Combed Yarn Spinners Association

## "LET'S GET TECHNICAL"

The Combed Yarn Spinners Association held its annual convention October 26-27 at The Cloister, Sea Island, Ga. Highlighting the meeting was a reminder from two textile educators that research can pay large dividends.

"LET'S Get Technical!" That was the title of a speech delivered by Dr. Malcolm Campbell, dean of the School of Textiles at North Carolina State College, at the annual convention of the Combed Yarn Spinners Association held Oct. 26 and 27 at The Cloister, Sea Island, Ga. And with that invitation, Dean Campbell launched into why, in his opinion, the textile industry should do just that. He shared the speaker's platform with Basil L. Whitener, representative from North Carolina's 11th Congressional District, and William A. Newell, research co-ordinator at the N. C. State College School of Textiles.

Dean Kennedy Torrence, vice-president and treasurer of the association, Mount Holly, N. C., was elected president. Ben R. Rudisill, N. C. S. M. representative from Gastonia, N. C., was elected

president. M. T. Cameron of A. M. Smyre Mfg. Co., Ranlo, N. C., was re-elected treasurer while C. C. Dawson, of Gastonia, was renamed executive secretary.

In hand-and-glove fashion, Dean Campbell expounded on his reasons why the textile industry should take greater advantage of the technological advances coming from research laboratories while Mr. Newell gave a resume of projects under way at the laboratories at State College and the services available to textile mills. These two speakers were heard after Representative Whitener had sounded a call for Congress "to again assert its constitutional authority in the regulation of foreign commerce" and then laid down a four-point legislative program to aid and protect the American textile industry.

## Opposition To Changes

The lack of changes in the spinning of combed yarns over the years was deplored by Dean Campbell in his address. Claiming most U. S. mills ignored new operational methods, he pointed to the sliver-to-yarn spinning system as an example. In Japanese mills of 50,000 spindles or more, Dean Campbell said he had seen high-quality combed yarns being spun directly from sliver, to counts as fine as 70s. "Here in this country where our standard of living and hence our wages are the highest in the world, wouldn't it mean more money in the bank if we could do the same?" he asked.

He also suggested that combed yarn spinners could profit by greater use of fiber laboratories placed in every day use. Claiming such laboratories need not be expensive, Dean Campbell said: "I cannot urge you too strongly to establish such a cotton fiber laboratory, as I know that it will pay real dividends."

Saying he had formulated the impression that entirely too many mills pay too little attention to the production of yarn of outstanding quality, the textile school dean urged the development and adoption of acceptable standards for spun yarns.

"It seems to me," he said, "that every spinner should concentrate his efforts on the production of yarns in the range of his operation that he could point with pride and say, with justification, that they are the very best in the business. With proper attention to quality, he should be able to guarantee, for every shipment, high minimum standards of strength, appearance, uniformity, freedom from spots, variation in density of package, and perhaps other important elements of quality. And, by the way, there are good standards for quality of combed yarns in the over-all sense. Couldn't the Combed Yarn Spinners Association take the lead in developing acceptable standards for yarn spun from say (1) American Upland cotton and (2) American Egyptian cotton?"

Other fields into which Dean Campbell invited the spinners to get technical included participation in the various technical meetings held for textile people each year in different parts of the country; real "quality control" programs, and a thorough-going study of manufacturing costs in the combed yarn industry.

#### Research And Progress

"Co-Operative Research and Textile Progress" was the title of the paper read by Mr. Newell and he outlined some of the work being done at the School of Textiles; some of the results obtained from the research; and services available to the textile industry.

"Our work for the cotton industry is conducted on a co-operative basis in which desirable projects, with the objectives of cutting costs, increasing production or improving quality, are supported by groups of mills each paying a share of the cost. In our current ten-mill cotton-combing project, each mill gets the benefit of participating in a major project at net cost, after taxes, of less than five per cent of the gross cost. In return, the project is conducted using the mill's own cotton, each mill receives reports confidentially during the project and has exclusive access to the results for an investment-amortization period after completion which, in practice, has been one year. At the conclusion of this period, the results are made public. Thus, we have developed a formula for getting research done for an industry that needs it and on a basis which it can afford," Mr. Newell explained.

On other work now being done in the laboratory, Mr. Newell had this to say: "Aside from the practical cotton-system processing research that is our main job, our work ranges into worsted-system processing, knitting, warp preparation and weaving, bleaching, dyeing and finishing and into such exotic areas as measuring fiber properties at minus 70 or at plus 400 degrees Fahrenheit. We produce knitted arteries for human beings made of an Orlon-Dacron blend, a device through which we have helped spare the lives of over 100 persons. We daily measure the effect on textile fibers of lethal doses of gamma rays and of the bombardment of fibers by neutrons at a rate of 100 billion per square centimeter per second—all to try to learn more about the effect of fiber structure on fiber performance. In this regard, we are not, as was once stated in a newspaper article, trying to develop bomb-proof suits—at least not intentionally.

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#### Four Point Legislative Program

After reviewing some of the problems currently plaguing the textile industry, Mr. Whitener in his address spelled out a four-point legislative program for the industry's protection from foreign competition. These included: (1) imposition of quotas upon the importation of foreign textiles through the tariff mechanism; (2) regulation of imports through protective tariff regulations; (3) elimination of the price advantage now enjoyed by foreign manufactur-

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ers in the purchase of American cotton; and (4) elimination of the practice of this government using American money to furnish textile machinery, equipment and raw materials to erect competitive business in foreign lands.

Using data furnished by the International Co-Operation Administration, Mr. Whitener reported the U. S. Government had expended \$130,270,000 for textile machinery to be put in place in the Far East, Near East, South Asia and Europe since 1948. During the same period, he reported, the I.C.A. and its predecessors have spent the sum of

\$2,317,360,000 for raw cotton to be placed into production in the textile plants in these foreign lands.

At a meeting of the board of directors it was decided to return to Sea Island for next year's convention and the dates selected were Sept. 11 and 12. New directors elected at this year's meeting include Aubrey A. Hobbs of Rex Mills Inc., Gastonia; C. J. Beaver, China Grove (N. C.) Cotton Mills Co.; A. G. Myers Jr., Textiles-Incorporated, Gastonia; and Harry Horrocks, American Thread Co., New York City. Directors whose terms expired were A. W. Bell; Eugene Cross, Cross Cotton Mills, Marion, N. C.; J. Burton Frierson, Dixie Mercerizing Co., Chattanooga, Tenn.; and Arnold Kiser, Sadie Cotton Mills, Kings Mountain, N. C.

## *T.Q.C.A. Meeting*

# **'Optimum Size' Packages, Not 'Large Size' Viewed As Key To Improved Yarn Quality**

The Textile Quality Control Association held one of its best meetings ever Sept. 19-20 in Charlotte, N. C. More than 120 members and guests heard five speakers and a panel discussion on topics concerning quality, package sizes and roll coverings. Some of the important points covered by the speakers are recounted in this article.

THE Textile Quality Control Association held its Fall meeting Sept. 19-20 at the Barringer Hotel, Charlotte, N. C. The meeting was divided into two technical sessions, Thursday afternoon and Friday morning with a dinner included Thursday evening. Chairman for the Thursday afternoon meeting was Horace Pennington, Cone Mills Corp. The first speaker of the session was Randolph Lux, research statistician, Whitin Machine Works, Whitinsville, Mass., whose address was entitled, "Economies Of Large Packages In The Textile Industry."

Mr. Lux said that "not too many years ago, mill package sizes were fairly well standardized depending upon the yarn count being produced. Now there are so many choices available that it becomes quite important to determine which package size can be used most profitably when all of the factors involved are considered. All too frequently, the answer cannot be determined by what may seem to be obvious." He was referring to the widely varying effect which large packages in one process have on the previous and subsequent processes. Also, the question of in which direction money could be best directed to obtain the maximum savings in labor and improvement in quality.

He pointed out that the largest package possible to produce on models of machines in place, or on new machines, may not always be the optimum size insofar as the productive cost per pound is concerned. He said, "It is sometimes found that even though the reduction in the productive cost per pound in a given process under study does not justify the expenditure necessary to produce the larger package,

the effect on the succeeding process may be sufficient to justify the conversion."

Through use of a cost analysis of a typical mill, Mr. Lux made several significant observations with regard to large package economics. In speaking of pickers, he said that since the diameter of the lap is limited to the space available on the card, additional lap weight must be accomplished by condensing the sheet being wound. No additional floor space will be required for this conversion, he said, and "the optimum size to use is the heaviest lap practicable to produce and handle" within these limits. Assuming that picker production is balanced with the rest of the mill's machinery, Mr. Lux said that "the only area in which the productive cost per pound could be reduced would be the direct labor cost." A mill which employs only one picker tender can obviously not eliminate this job and there is no justification in the conversion on this basis alone. However, Mr. Lux pointed out that this justification may be found in labor savings on cards by the increase in the lap laying cycle afforded by larger laps.

### **Card Can Evaluation**

In the evaluation of larger packages on the cards, Mr. Lux said that the only area in which a reduction in the productive cost per pound can be expected is in the direct labor or the card tender classification. He introduced calculations considering floor space, work load, doffing frequency, estimated cost, salvage value, and cost of new cans in explaining the steps necessary to determine optimum can size for the individual mill. The cost analysis which he worked out indicated that for a hypothetical case the 14x12-inch can is the optimum size. He said, however, that "the 15x36-inch can will hold approximately the same poundage. With cans 36 inches high, springs and plates are not required and are less awkward to handle."

In speaking of the effect of large card cans on the drawing tender's workload, Mr. Lux said that only the operator's time spent in creeling breaker drawing would be changed.

He assumed that 22 per cent of the tender's workload was involved with creeling breaker drawing. The outcome of his calculations was that the hypothetical mill would not eliminate a drawing tender's job by the addition of large cans on cards alone. Carrying his thinking further he investigated the effect of conversion to large cans on drawing, in addition to the cards.

Mr. Lux said that there are two choices to be made in determining the economic value of large can conversion in drawing. "These two choices are conversion of existing drawing and the purchase of entirely new drawing," he said. "In the conversion of existing drawing, the cost of conversion will, in all probability, be lower than the cost of new drawing but the maximum size can be limited by the gauge of the existing machinery."

He emphasized the need for "a sequence of evaluations" made on all processes from picking through spooling or cone winding. In stressing this point he said, "In the illustration of the analysis of larger packages on the cards, calculations indicated that with larger cans only, the 16x12-inch can is the optimum size. However, by the use of larger laps, the 14x42-inch can is the optimum size."

### Large Package Spinning

"Many mill men believe that the greatest economic advantages are secured in spinning by using the largest possible bobbin size," he said, and added, "This point should be most carefully considered to be certain that all the cost factors are included in the analysis. Some of these are not readily apparent. It is quite possible to be strongly influenced by the easily seen reduction in doffing, winding or spooling labor costs."

The use of larger rings involves the following cost factors, Mr. Lux pointed out: (1) higher price per spindle; (2) more spindles required; (3) higher cost of maintaining more spindles; (4) fewer spindles per frame requiring more frames; (5) more floor space; (6) more lighting; (7) more heating; (8) more humidification; (9) more air conditioning; and (10) higher taxes, insurance and depreciation on machinery. "If additional production is desirable and can be accomplished in the same area," he said, "the increased production will reduce the cost on the following items: (1) indirect labor; (2) room general labor; (3) mill general labor; (4) supervision; and (5) fixed overhead. Also any increased profit that may be realized by the increased production should be credited to the condition producing it."

Mr. Lux concluded his paper saying that "when all cost factors are considered, it will be found that in many cases the largest package practical to produce, on any process, is not necessarily the most economical."

### Quality Aspects

The second speaker at the meeting's first session was June Cheek, Aleo Mfg. Co., Rockingham, N. C., whose subject was "Quality Aspects Of Large Packages." He said that "in this very competitive era, low cost and excellent quality are musts. Low costs are required to get orders and quality is a must to keep the orders." The distinct advantages found in converting to larger packages which are prevalent in all processes were cited by Mr. Cheek as being (1) when converting, "the machinery, whether new or changeovers are bought, which give you the latest devel-



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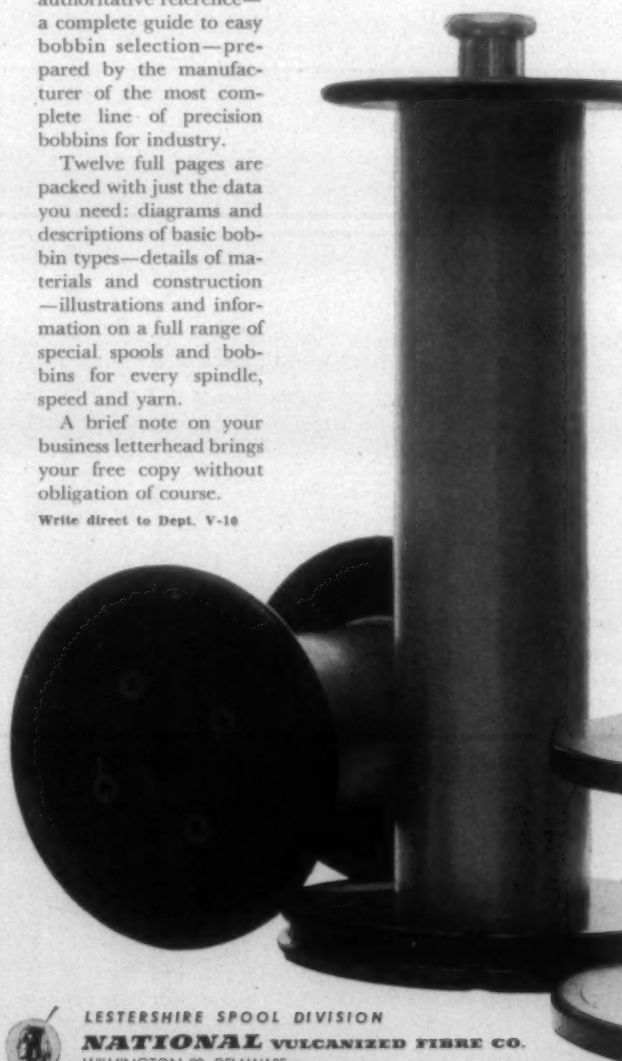
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opments known in the industry; (2) with large packages you automatically have less creeling which improves evenness (less thick and thin places); and (3) reduction in reworkable waste."

In speaking of the improvements in quality afforded by the large picker lap, Mr. Cheek said that there is as much as 50 per cent fewer thick and thin places put in card sliver due to fewer lap layings being necessary. Any irregularity at the end of the picker lap due to mechanical causes on the picker is likewise reduced. Approximately the same percentage of reworkable picker lap waste is saved in increasing the size of the picker lap. He pointed out that most mills, at one time or another, find that they have to store laps for some period of time. Since the heavier laps are in a more compressed state, he said that air currents do less damage to the outside layers of these stored laps. He said, however, that using heavier laps made proper maintenance on pickers more necessary because a reject lap would be twice as detrimental as before.

### Large Card Cans

Mr. Cheek said that large cans on the cards will not make the card sliver any better but they may help to correct bad practices. He said that some mills might be trying to pack the cans too full and that "there is no doubt that the sliver on the top of the can that has been twisted and turned by the coiler is giving us some trouble that will be eliminated if we can get larger coilers." He pointed out that these practices are not corrected by the conversions but are corrected because of them.

### Drawing Improvements

The use of larger cans on drawing is intended to lengthen the creeling cycle of the process. Quality improvements which can be cited for conversion to large cans include: (1) fewer can to can piecings resulting in better evenness; (2) less waste because of less creeling; (3) improved or reworked rolls and roll bearings result in better uniformity; and (4) the use of extended creels in conjunction with the larger cans reduces sliver variation caused by frictional drag. Mr. Cheek feels that "these extended creels are very worthwhile even if you do not have large cans."

Saying that a 10x5 frame is now considered a small package, Mr. Cheek noted the newly-developed 12x7 package which holds from 55 to 60 ounces affords quality improvements. The new cone which had to be developed before using the 12x7 package improved the tension control of the frame. He also said that the improved drafting systems which were developed for the large package frame allow improved running qualities. He said that "with the decreased creeling resulting from larger creel cans, the improved drafting, and the stop motions, there is a definite improvement in evenness." With fewer stops on the roving there will be fewer hard ends and fewer soft bobbins.

### Spinning Quality Affected

Spinning quality is usually affected more by the attachments or improvements which normally accompany large package conversions. Mr. Cheek cited vacuum lint collection and umbrella creels as two examples which contribute to fewer ends-down and improved yarn evenness and appearance. In closing, Mr. Cheek discussed the rapid changes seen in package sizes in the past ten years and he noted that "if

we as technical and operating personnel have an open and objective mind, the changes will be even more radical than they have been in the past."

### Vacuum Collection

The Friday morning session of the quality control meeting was under the chairmanship of W. A. Thomason, Thomason Textile Service Inc., Charlotte, N. C. The first speaker of the day was George Archer, Pneumafil Corp., Charlotte, who talked on the "Quality Aspects And Problems Of Spinning Ends-Down Collection." The full text of Mr. Archer's speech, which is deemed a highlight of the meeting, appears elsewhere in this journal.

In describing a vacuum ends-down collection system, Mr. Archer said that it "consists essentially of a pneumatic material recovery and cleaning system, a set of suction tubes or flutes replacing the scavenger rolls on the spinning frame, a collecting header or duct and a motor driven fan and filter collector unit." He pointed out that the flutes are provided with suction orifices spaced to coincide with roll deliveries and positioned near the yarn path leading from the nip of the rolls.

He discussed the operation of the system, inherent weaknesses in conventional clearers and the reduction in manual cleaning afforded by the use of such a system. He said that "between ten and 15 per cent of the ends which usually come down can be attributed to being caused by other ends coming down. In considering a mill which experienced a reduction of 30 per cent in ends-down after installation of a vacuum system, he said that the balance of the total reduction "obviously is because of the fewer balls of lint falling into the yarn and causing breakage at some point such as the traveler." He said that the effect on quality and ends-down in connection with higher drafts is more dramatic. With drafts of 40 and above he said that it is not uncommon for mills to experience reductions of 50 per cent or more in ends-down after installation of a vacuum collection system.

### Analysis Of Collected Waste

Mr. Archer said that on inspection of the vacuum system's collector box "it was found that out of an average of 37.8 grams collected per frame hour, some 23.6 grams were the product of pneumatic combing of yarn, 14.1 grams were the result of ends being down and 0.1 grams came from atmospheric fly." Another type of analysis of the content of the collector box was made in which it was determined that vacuum collected waste showed a 0.9 per cent decrease in maximum staple length as compared with the staple length of the roving.

A very real proof of the amount of cleaning done by the vacuum ends-down collection system was cited by Mr. Archer as being "the fact that normally the amount of sweeps from the spinning room is reduced by 50 per cent after installation." The staple length of the remaining sweeps is shorter, he said.

Speaking of problems which confront the use of vacuum collection systems, Mr. Archer said that finding the correct flute for the specific type of stock is one of the most important. He said that "by slow, heart-breaking trial and error it has been found that one type of flute best suits the cotton and shorter fiber rayons of light denier. Another is better suited to the coarser and longer staples. Still another

is indicated in the case of the extremely coarse synthetics, jute, flax, asbestos and other difficult fibers." He said that he did not mean to imply that three types of flutes are all that are necessary.

There is also the problem of the metal flute versus the plastic flute. He said that it is almost cheaper to buy a new flute than to repair and smooth the orifice when it had been damaged by a slipped stand hook. "With the plastic flute usually a drop of acetone brushed on with a camel hair brush makes the scratch lint-free again," he said.

Improvements in quality are noted in the yarn by the reduction of elimination of wild or flying ends, spinning doublings, slubs, gouts, fly and piecing, according to Mr. Archer. "The elimination of the processing through a waste machine preserves the fibers intact," he said and added that "normally there are no threads in the waste." He concluded, saying that since the work runs better in the spinning room, warping and weaving quality are increased.

### Roll Coverings

"New Developments In Roll Covering and Aprons" was the subject of the second speaker of the Friday morning session, R. S. Olcott, Armstrong Research And Development Center, Armstrong Cork Co. Mr. Olcott discussed the history behind the development of synthetic rubber cots. He said that "after testing hundreds of additives and determining the effect of these materials on the fiber handling properties of roll coverings, we discovered that the lapping behavior was related to electrokinetic phenomena and that the adhesion of textile fibers to the surface of a cot, which causes lapping up, depends upon the electrokinetic or zeta potential at the cot surface."

Laboratory experiments lead to the assumption that "the moisture layers on both the cot and fiber surface were held firmly to the cot and fiber surface due to this electrokinetic effect," he said. This adhesive force is lessened or even reduced to zero by the incorporation of certain water-ionizable materials or electrolytes in the cot formulation. Mr. Olcott said that after a lengthy and successful field test program roll coverings incorporating the electrolyte principle were offered on a commercial scale. The most popular of these new compounds is J-490.

### Anti-Static Cot

Much work has been done on developing anti-static cots which have resistance to picking up fly, fuzzy yarn and top roll lapping. Mr. Olcott told of this work and the results were shown in a motion picture film which had been taken with a time-lapse camera. In this sequence, one frame of film was exposed every ten seconds for a total lapsed time of three hours. It was noted that the No-764 anti-static cot did not pick up waste materials while a companion conventional cot readily accumulated the undesirable fiber. An important fact discovered during this test was that the waste picked up by the conventional cot was between five and ten times the weight of waste picked up by the anti-static cot.

### Eyebrow Resistant Cots

The development of roll coverings which are resistant to eyebrowing "was based mainly on the incorporation of high friction cork or other coarse particle sized fillers into a binder based on our lap resistant formulations," Mr. Olcott



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said. A common fault found in present eyebrow resistant formulations was that they would slick up or polish rapidly, especially in sunlit alleys and commence eyebrowing, he said. Another fault he cited was the coarse particle filler tended to cause an excessive amount of waste generation. He told of the new developments and showed the dramatic success of the new compound with the aid of time-lapse motion pictures. He said that the mills testing this compound reported reduced clearer picking schedules as well as improved yarn quality due to the absence of waste dropped in from the clearer or picked up by the yarn from the eyebrow.

#### The Human Element

The final speaker at the meeting was Earl Barker, Celanese Corp. of America, Charlotte, N. C., who spoke on "The Human Element In Textile Quality Control." He said that one of the most important phases of the installation of a quality control program was in properly selling it to the employees in the mill. He said that this step was often omitted and as a result the program fails or bogs down. "The men and women in the mill have a different kind of thinking and the ideas and mechanics must be explained on a level of understanding that those individuals use in their everyday conversation," he said.

Mr. Barker also pointed out that "the supervisor of the department must sell his foremen on such a program and get their full co-operation." The foreman plays a key roll in selling the program to the individual employee and he must be thoroughly convinced of the merit in the program.

#### Causes Of Failure

Twelve causes of failure of a quality control program were cited by Mr. Barker. These causes are listed in the following lines but are not necessarily in order of their importance. (1) Improper supervisory interpretations of the quality control program. This may be due to misunderstanding of the program or an effort to impose his ideas without approval of the program's supervisor. (2) Unreasonable demands are sometimes made on supervisors and employees. (3) Loop holes sometimes arise through which actions may be taken which defeat the purpose of the program. (4) Individual carelessness may result in the failure of a quality control program. (5) Friction between employees, supervisors or departments may cause failure of a well-conceived program. (6) Disagreement with the program by certain individuals may reduce the program's effectiveness. (7) The program may be impaired by employees taking advantage of the supervisor in certain matters. (8) Supervisors or employees may form wrong preconceived opinions of the program. (9) Employee failure may be due to hangovers, fatigue, working two jobs, night life, etc. (10) Horseplay may be detrimental to proper implementation of a control program. (11) Stock in process, and therefore the control program, may be damaged by careless handling procedures. (12) Lack of full explanation of changes made in normal operating procedure may hurt the effectiveness of the program.

#### Avoid Inflexible Procedures

In the implementation of a quality control program, inflexible procedures should be avoided in every possible instance. Mr. Barker said that "the situation can be improved

by a generous application of the Golden Rule and by making the system flexible enough so that everyone can operate within the rules and still show their individuality." He closed by saying that no blanket formula can be used to approach a group of people to get support for a program. "Therefore," he said, "experience of this nature can only be used to teach us to keep in mind that individuals must be approached differently, depending on the problem."



## Annual Outing

### Chattanooga Yarn Association

SOME 300 persons attended the 32nd annual outing of the Chattanooga Yarn Association at the Read House in Chattanooga last month. The record turnout, described as one of the most jovial groups in the history of the event, did the expected and outlawed any and all talk about business matters. And with this adopted air of gaiety, the mill men and their guests divided their time between golf, skeet shooting, gin rummy and what was appropriately phrased as "telling of the tall tale." And in the latter category, everyone came away a winner.

Possibly less keener competition existed in the outing's 36-hole golf tournament, where the marbles for both low gross and low net honors were garnered by M. C. James of Knoxville. Mr. James toured the Fairyland Golf Club course on Lookout Mountain with rounds of 74-71 for a low gross 145 and a low net of 142. Second low gross honors were shared by three Chattanoogaans — Marshall Goree, R. K. (Dixie) Howell and Dick Thomas. All had 149s. Messrs. Goree and Thomas had rounds of 74-75, while Mr. Howell paired an opening round 80 with a second round two-under-par 69.

In the hole-in-one contest feature of the tournament, there were none of the same, but Ed Norman of Standard-



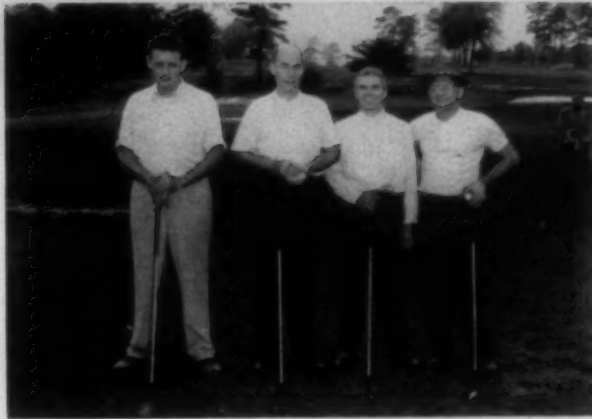
D. Boone, Bill Shugart, M. C. James, Pete Morrow



Paul Conley, George S. Johnston, Ed Reid, John Land



Rudd Hardesty, Bill Hardman, Frank Cater, Jack Thompson



W. G. Quick, W. T. Swoyer, Carl Ferenbach, Charles J. Mozur



C. H. Rowe, D. Brinton, H. G. Kellett, H. S. Gordon



A. T. Mozur, J. H. Everett, Bill Chesnutt, T. C. Smotherman



W. H. Cobble, Bill Cobble, Arthur Cobble, George Bryan



David Gott, Jack Stripling, Tom Brown, Al Wilson

Coosa-Thatcher came closest with a tee shot on the 195-yard tenth hole coming to rest only five feet nine inches from the cup. Eugene Dye of Lavonia (Ga.) Mfg. Co. placed second with a shot 12 feet three inches from the cup.

Top honors in the skeet shoot held at the Chattanooga Rod and Gun Club range went to Dan Boone Jr. of Chattanooga. Prizes for all events were awarded at the banquet which ended the outing. Hubert O. Fry, president of the association, presided at the banquet. Other officers of the association are Harvey Davenport, American & Efrid Mills,

vice-president; George Bailey, Comer-Avondale Mills, secretary; and R. D. McDonald, yarn broker, treasurer.

Chairmen of the committees which made the outing such a tremendous success were R. H. Griffith, yarn broker, chairman of the golf committee; George Bailey, chairman of the skeet shoot; Frank M. Carter, chairman of invitations; Bob Mebane, chairman of the committee arranging the floor show; Marshall Goree, handicap committee; H. E. (Bevo) Anderson, U. S. Rubber Co., prizes; F. N. Belk, hotels and reservations; Hubert Upham, Walter T. Forbes Co., publicity; and Harvey Davenport, registration.



Ben Cummings, Bob Taylor, Bob Boyd, Al Livingston



Don Maddox, Frank Carter, Bill Bowman, Tom Weir



Bill Galey, Bill Lowrey, Blackwell Smith, Elliott Neal



Frank Ramsey, Bill Reichenbach, Frank Callaghan, Bob Kienel



R. K. Howell Jr., R. C. Jordan, M. C. Gamble, E. J. Doyle



B. B. Akins, J. T. Jones, Decatur Cunningham, Hubert Durham

# *Opening, Picking, Carding & Spinning*

## **Some Quality Aspects And Problems Of**

# **Spinning Ends-Down Collection**

By GEORGE ARCHER, Pneumafil Corp., Charlotte, N. C.

In a paper delivered before the Fall meeting of the Textile Quality Control Association in Charlotte, N. C., and published here in its entirety, the writer describes the vacuum ends-down collection system and details its effect on the quality of yarns produced with it. He points out the dramatic effect of the system on quality and ends down in connection with higher drafts and also explains some of the problems faced in the selection and installation of such a system.

**I**N order to intelligently discuss the quality aspects and problems of spinning ends-down collection a brief review of the history and function of spinning ends-down collection system is indicated. More than ten years ago the first vacuum waste collection for ends-down collection systems was manufactured in the U. S. The system had already been developed to a marked degree in Europe during the eight or ten years prior to that time and the know-how and license was passed along to a U. S. company as well as to one in England.

Vacuum ends-down collection for the spinning frame consists essentially of a pneumatic material recovery and cleaning system, a set of suction tubes or flutes replacing the scavenger rolls on the spinning frame, a collecting header or duct and a motor driven fan and filter collector unit. The flutes are provided with suction orifices spaced to coincide with roll deliveries and positioned near the yarn path leading from the nip of the rolls. They are connected to the collecting header which runs the length of the frame and beneath the creels or samsons. The header is connected to the suction intake of the collector unit which usually is mounted above the frame drive. This description is somewhat simplified because of the variations in installations of different types of spinning equipment.

### **Operation Of System**

Air is drawn continuously into the suction flutes from the entire drafting system and across the material being spun. Free lint and foreign matter is removed from the yarn as it emerges from the front rolls. Likewise a large percentage of floating fly and fibers in the vicinity of the

yarn path are sucked into the system and collected before it has an opportunity to settle on the frame or be dispersed throughout the spinning room. When an end comes down, the drafted roving leaving the front rolls is picked up immediately by the corresponding suction orifice. It is conveyed pneumatically to the collector unit where it is accumulated in the form of open loose material ready for reprocessing.

Wild or flying ends and resulting doublings are eliminated. The vacuum cleaning effect provided at each roll boss collects practically all free fibers and fly released in this area. Consequently, there are fewer slubs and gouts spun in the yarn. For example, those bits of fly which formerly fell into and became entangled in the yarn near the delivery rolls are entrapped in the system's air stream and deposited in the collector unit. Obviously those slubs and gouts caused by removing, cleaning and replacing the conventional scavenger roll are eliminated. Since the vicinity of the front roll is being constantly deprived of lint by the suction system, there are fewer particles of lint falling upon the roll and therefore less material being picked up by the clearers.

Clearers are a source of slubs and gouts. When a clearer is picked too often excessive gouts are formed during the picking operation itself. It is well known that when a clearer is picked too seldom large bunches of fly slub off into the yarn causing more gouts and slubs. Lowering the amounts of clearer waste is a definite aid to quality.

### **Manual Cleaning Reduced**

Because of this same reduction of lint in the air, spinning guides normally are run out only half as often after the application of suction equipment. As in any cleaning operation slubs and gouts are created every time guides are run out. Of course, even more are created if the guides are not run out often enough. The decreased need for cleaning is a definite quality asset in this case.

In like manner all parts of the creel and even all parts of the frame above and below the roll beams stay substantially cleaner when the vacuum system is used. When the correct air quantities are moved by the fan, the air in the spinning room is filtered many times per hour. A very real proof of the amount of cleaning done by the vacuum ends-down collection system is the fact that

## OPENING, PICKING, CARDING & SPINNING

normally the amount of sweeps from the spinning room is reduced by 50 per cent. The staple length of the remaining sweeps is shorter.

Ends-down are usually reduced between 25 and 50 per cent where the equipment is properly tailored to the frame and to the type of stock being run. Also careful attention must be given to the length of the staple and the denier. We have found it futile to go "elephant hunting" with a squirrel gun.

### Reduction In Ends-Down

Frequently, there is doubt expressed concerning the usual reduction in ends-down. Let us first consider a mill that experienced a reduction of 30 per cent in ends-down after installing a vacuum collection system. Between ten and 15 per cent of the ends which usually come down can be attributed to being caused by other ends coming down. The balance of the 30 per cent obviously is because of the fewer balls of lint falling into the yarn and causing breakage at some point such as the traveler.

The effect on quality and ends-down in connection with higher drafts is dramatic. For example, with drafts of 40 and above it is not uncommon for mills to experience reductions of 50 per cent or more in ends-down. I know of one case where the ends per thousand spindle hours was more than 50 and dropped to less than 20 after the application of the vacuum collection system. Admittedly this is extreme but in quite a number of cases 40 to 45 ends-down per thousand spindle hours dropped to 20 to 25.

It is well known that the higher the draft, the more fly. In addition, the fly has longer staple length. There is very little difference in the amount of fly made with a draft of

15 and that made with a draft of 25. In the case of one test the total fly amounted to just a little less than 0.5 per cent of production. However, the total fly made in the spinning room using a draft of 40 is a little more than 0.75 per cent.

The importance of the effect of the vacuum system on the fly is pointed up by the following test results:

(1) ends-down reduced 24 per cent; (2) yarn defects caused by accumulation of fly falling into and spinning into the yarn reduced by 73 per cent; (3) fly in atmosphere reduced by 50 per cent and accumulation of fly on the frames reduced by 75 per cent; (4) the amount of sweepings reduced by 0.2 per cent of total production; and (5) the work load on the piecer reduced by 24 per cent.

The majority of the reduction in sweepings, if not the entire amount, was because of the fact that the vacuum system collected those fibers which were only entangled for a short part of their length and which would have been shaken or blown off had they not been collected by the vacuum system. Since it was assumed that up to 0.2 per cent of the total production represented an increase in the finished product obtained on a given amount of raw stock, it was considered well to inspect the contents of the vacuum system's collector box. It was found that out of an average of 37.8 grams collected per frame hour, some 23.6 grams were the product of pneumatic combing of yarns, 14.1 grams were the result of ends being down and 0.1 grams came from atmospheric fly.

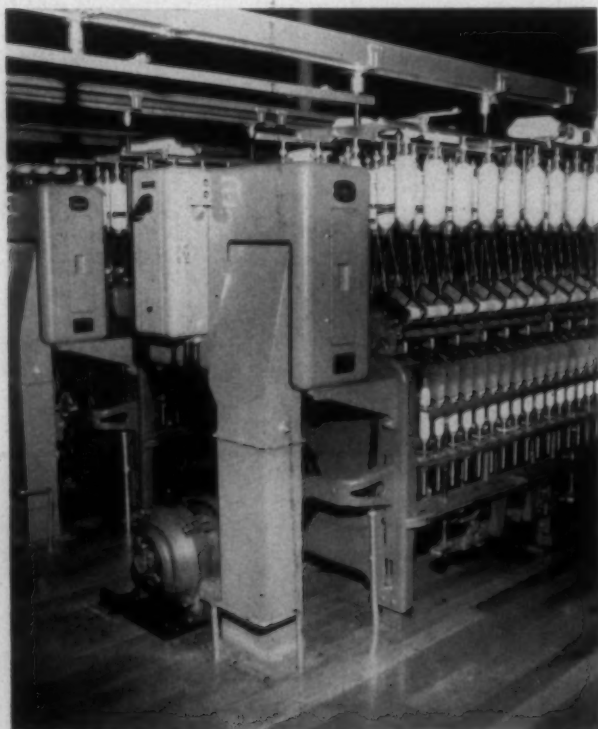
Another type of analysis of the content of the collector box was made in which it was determined that vacuum collected waste showed a 0.9 per cent decrease in maximum staple length as compared with the staple length of the roving. The same was true of the maximum staple length of scavenger roll waste reworked. However, the staple diagram analysis showed further that while there was a loss of approximately 5.3 per cent in effective staple length for scavenger roll waste, there was only a loss of 1.9 per cent in effective staple length for vacuum collected waste.

### Winder And Spooler Quality

Tracing the quality from the spinning frame on to the winders or spoolers also shows a very definite effect caused by the vacuum systems. There are from 15 to 40 per cent fewer winder breaks or tailings from the spoolers. Here again there is a definite tie-in with the draft in the spinning room. The higher figure of reduction comes from a mill using high draft for the spinning. This of course is logical since we know that every end down is a potential winder or spooler break.

Weaving is affected in the same way, of course. Every end down in the spinning is a potential end break on the loom as the piecing proceeds from the whip roll to the cloth roll over the obstacle course consisting of the drop wires, heddles and reed. In the filling, the piecings must successfully thread through the shuttle eye.

In addition to the piecings, the number of slubs and gouts in both filling and warp are affected by the vacuum collection system. These bunches of fiber are vulnerable to the obstacle course just as in the case of piecings. One mill reported a 25 per cent reduction in warp breaks and a 20 per cent increase in weaver assignments after installation of the vacuum collection system. It is interesting to note that this same mill reported a 30 per cent reduction in spooler re-ties.



This example of vacuum collection combines individual frame waste collection with a central air recovery unit.

## Problems To Be Faced

Problems connected with spinning ends-down collection are very real. Take for example the problem of the flute. Life would be very simple if a single type of flute would best suit all purposes. By slow heart breaking trial and error it has been found that one type of flute best suits the cotton and shorter fiber rayons of light denier. Another is better suited to the coarser and longer staples. Still another is indicated in the case of the extremely coarse synthetics, jute, flax, asbestos and other difficult fibers. This does not imply that three types of flutes are all that are necessary.

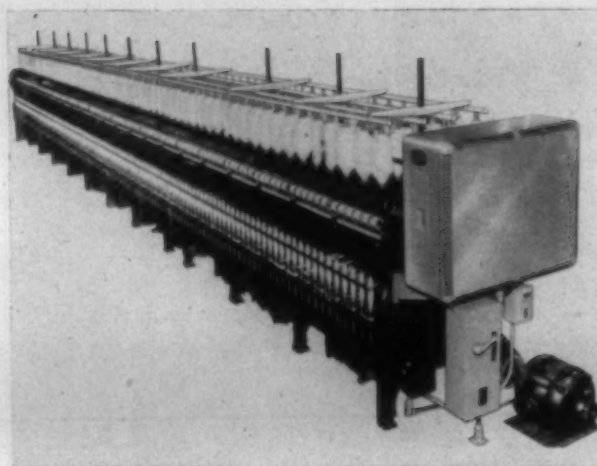
Then there are the problems of the best type adaption to the various makes and types of frames. The size and shape of the orifices have a lot to do with the performance of the equipment. There is the problem of the metal flute versus the plastic flute. In the earlier days all of the flutes were made of metal. A stand hook slipped and it was almost cheaper to buy a new flute than to repair and smooth the orifice. With the plastic flute, usually a drop of acetone brushed on with a camel hair brush makes the scratch lint-free again.

There have been cases where we have departed from the round cross section. Cleaning and maintenance is made more difficult and invariably the pendulum swings back to the round or nearly round cross section. Flutes of all sizes from about  $\frac{7}{8}$ -inch to about  $1\frac{1}{8}$ -inch in diameter are used. In order to handle the quantities of air that are indicated even the largest flutes in use are minimum. The large volume of air actually does the cleaning job in any vacuum system. When the large flute became a problem as far as getting it out of the spinner's way, then methods of pushing it back and repositioning the orifices were developed.

Another problem was how to exhaust the air. Originally, with a scroll type fan, the exhaust could either be pointed upward or downward. Pointed upward it spotted the ceiling. Pointed downward in many cases it gave an unsatisfactory temperature and humidity distribution along the spinning frame. Later the diffusor type exhaust permitted the handling of the air in any direction or as many directions as possible. This has proven extremely important in the spinning of certain fibers where strong air currents of any kind can be disastrous. The later type fan with the diffusor venturi also solved another problem. The old type scroll exhaust fan had a good efficiency but only when it was operated exactly at a certain pressure and volume. As is characteristic of such fans, should the desired pressure and volume be between optimum operating characteristics of two fan sizes, it became difficult to secure optimum results. A later diffusor type fan had a much better efficiency curve, equalling the efficiency of the scroll type fan at their respective maximum points but far exceeding the efficiency of the scroll type fan at intermediate points because of the flat curves.

## Heat Dispersal

Perhaps one of the most constant complaints from the very first was caused by the problem of added heat to the spinning room. The central type of equipment proved to be the answer to this problem. In this case, a central motor and fan draw air from a group of spinning frames, exhausting it usually outdoors in the Summer-time or returning it to the air conditioning system in the Winter. When



Air is exhausted through a full 360 degree angle from this installation of individual frame vacuum collection system.

the air conditioning system is operating with refrigeration, air is returned to the system at all times. In this way the heat from the fan motors is not liberated into the room. The central vacuum system can be extended to enclose the spinning frame motor if desired. In one case of this kind, first of all the fan power heat amounting to some 4,000 b.t.u. per hour per frame was taken out of the room. The heat from the spinning frame motor casing amounting to some 2,500 b.t.u. per hour is exhausted. In this way approximately 6,500 b.t.u. per hour per frame can be exhausted from the room to say nothing of the additional heat which rises by convection from the many heat producing bearings along the frame and is sucked into the vacuum system flutes. In this way it is possible to wind up with much more evenly distributed temperature and humidity when using the central type of system with fewer heating units in the room instead of added heat and greater differentials of temperature and humidity. Stress is placed on the distribution of the humidified air because it is common knowledge that this factor plays a tremendously important part in the running of the work and the consequent quality.

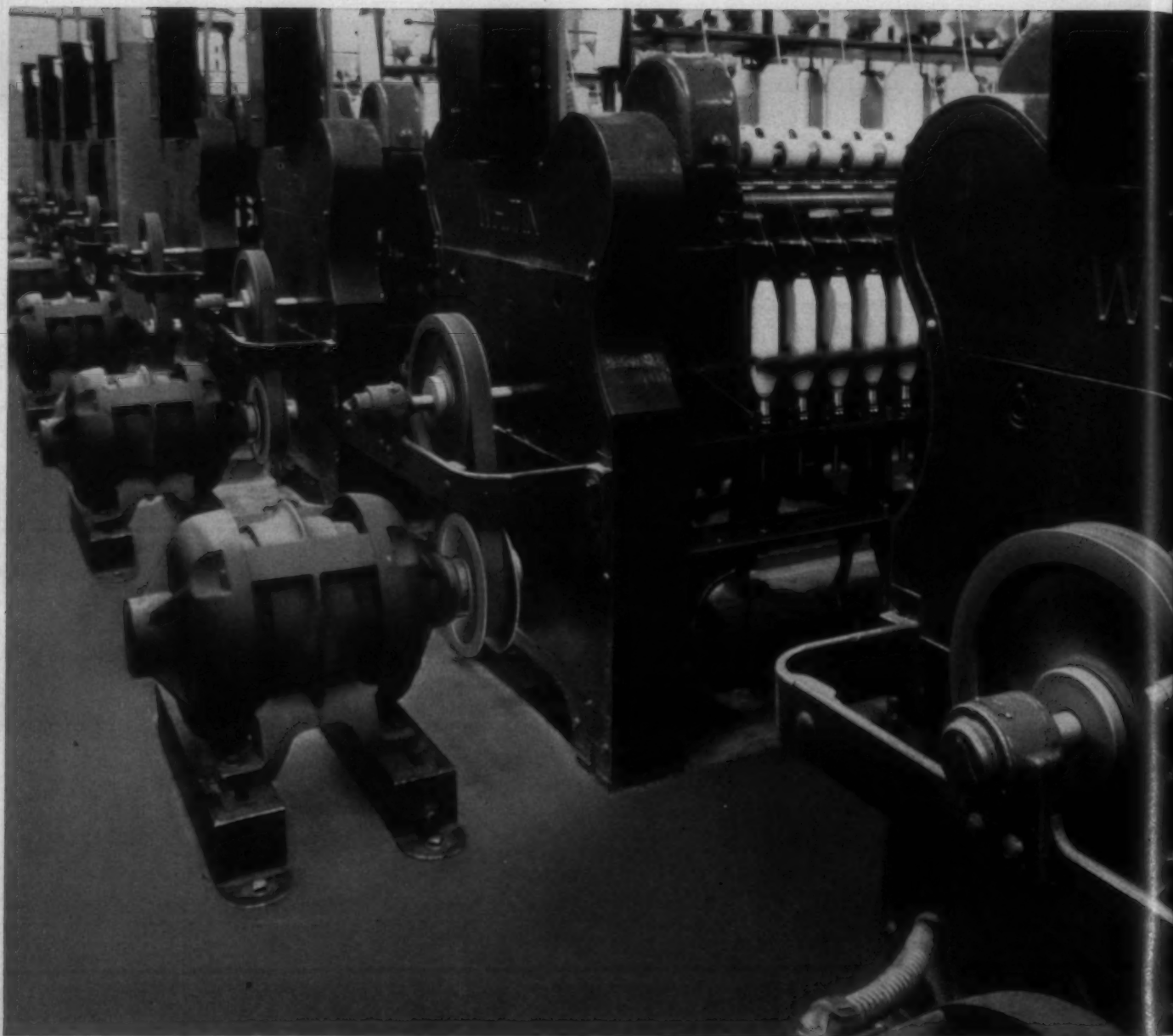
One point previously touched on was the comparison of vacuum collected waste with garnetted spinner balls. A certain amount of care in manufacturing and in operating vacuum waste equipment is necessary to insure untwisted, easily respinnable fiber. The central material recovery system, a special adaptation of the central type vacuum collection system described above, delivers the collected fiber directly to the picker or blending feeder. With this type of equipment, the fibers are completely opened, lofty and in optimum condition for reworking. When using this system, provision must be made for the handling of waste when the pickers are stopped for cleaning or other reasons. In this case, the unit is built with a two-way collection system installed with a damper to divert the fiber to a collection box. It is later fed back into the pickers when they resume operation.

One yarn mill making a very high quality sales yarn has been for years been selling its spinner balls. It set up its material recovery system to deliver the collected fiber to the baling press. Noting the extremely good condition of the fiber, it experimented and now finds it possible to reuse the ends-down waste with no adverse effects.

Speaking of the central material recovery system reminds

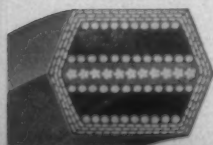
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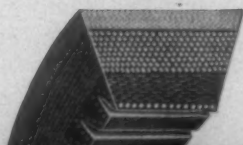


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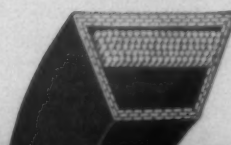
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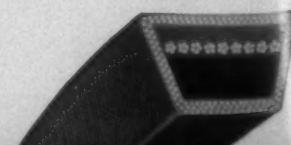
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# MAN-HOURS PER WEEK

with Dayton Variable Speed Drive Assemblies"

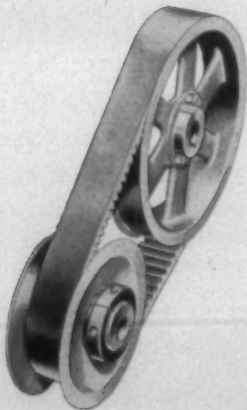
"Dayton variable speed drives are one of the greatest things we've put in the spinning room!" says the Overseer of a major North Carolina spinning mill.

"In the past, it took us approximately 1 hour to change speed on each of our 88 spinning frames. And, if a pulley was off-size and we couldn't make the required speed, why, the whole process had to be repeated. Now we change speed on any of the spinning frames equipped with Dayton Variable Speed Cog-Belts\* in 5 to 8 minutes. I'd estimate we're saving 25 man-hours a week in change-over time alone. And, we've gotten rid of our 4 groove sheaves and big

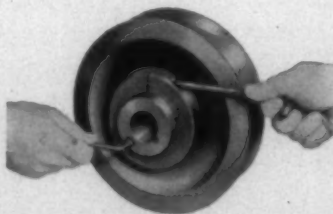
belt inventory — they're no longer necessary since we changed over to Dayton Variable Speed Cog-Belts.

"Worth more to us in dollars and cents is the fact that, with Dayton Variable Speed Drives, we can easily correct our speed to the last 'turn.' When conditions are right, we can just as easily increase our front roller speed to get the absolute maximum in production. As an example, say the speed of the front rollers was 150 rpm and the job was running good. In just a few minutes, with Dayton Variable Speed Drives, we can increase speed from 150 to 152 rpm and increase production 1-1/3%. That's where you can really make a profit!"

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**For the name of the selected Distributor carrying the complete Dayton Variable Speed Drive Assembly in your area, write The Dayton Rubber Company, Industrial Replacement Div., Dayton 1, Ohio.**

## Dayton Rubber

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me of another common problem which occurs when there is not enough room to install collector units. With the central material recovery system, it has been possible on occasion to elbow down through the spinning room floor without coming outside of the head end or the foot end of the frame. In other cases, only a duct of a few inches depth need be used instead of a collector unit measuring a foot or more. In many cases risers can be used, extending to ducts on the spinning room ceiling, in the event the spinning room is on the ground floor. Where a mill is using overhead belt drives, the central material recovery system with risers is a natural since the overhead cleaners must go around the belts anyway and usually the ducts can be run adjacent to the belts.

The problems connected with spinning ends-down collection systems present a challenge. However, the quality aspects alone, to say nothing of the very real opportunities to lower manufacturing costs, have made it worth meeting this challenge. Some of these quality aspects are improved yarn quality by the elimination of wild or flying ends, by eliminating spinning doublings, by definitely decreasing slubs, gouts, fly and piecings. The elimination of the processing through waste machines preserves the fibers intact. Normally there are no threads in the waste. Since the work runs better in the spinning room, warping and weaving quality are also increased. A cleaner spinning room reacts on the personnel to stimulate additional job pride and thus accumulatively still higher quality.

## *Warp Preparation & Weaving*

# A Study in Loom Fixing

By FRANK D. HERRING

**T**HIS article is being written as an aid in helping the loom fixer become a more efficient workman. A good loom fixer will spend quite a lot of time checking over the looms on his section. This is good preventive loom fixing and it will enable him to locate minor troubles which can be remedied easily and quickly before they develop into bigger jobs and, perhaps, cause several yards of second quality cloth.

The loom fixer's first duty is to try and get to a loom as quickly as possible after it has been flagged for his attention. He should fix the loom and get it back into production with all possible speed. He should try to fix the loom properly and leave it in such condition that he will not be called back to it because of overlooking something which needed attention. This can best be accomplished by doing some planned routine checking every time the fixer works on a loom regardless of the cause.

Regardless of the trouble on the loom, the fixer should always examine the shuttle thoroughly to determine if it is in good condition. The shuttle can be called the heart of the loom and unless it is kept in good condition it can be the source of many troubles for the loom fixer and the weaver. If the shuttle is excessively worn it should be replaced. The loom cannot operate efficiently with a worn out shuttle.

The bobbin in the shuttle should be held tightly and perfectly in line with the shuttle eye. All of the bristles, or frictions, should be in place, properly spaced, and not excessively worn. No hard and fast rules for bristling the shuttle can be given that will apply to all weaving mills. This is dependent on many conditions and will have to be worked out in each case to meet local conditions. These conditions are determined by the speed of the loom, the type and number of the filling yarn, the twist of the filling yarn, the wind of the filling yarn on the bobbin, etc.

The shuttle travels at a high rate of speed while the loom is in operation but it must be brought to an abrupt stop in the shuttle box on each and every pick. While the shuttle travels across the lay the filling yarn will have a tendency to balloon in the shuttle. When the shuttle stops in the box on the battery end of the loom, this ballooning action may cause the filling yarn to sluff or pile off into the shuttle eye. Sometimes the shuttle eye will become unthreaded entirely or the filling yarn will choke the eye. In either event the filling yarn will become broken. This is one of the sources of thin places and mispicks.

The ballooning and piling-off actions of the filling is much more difficult to control on the coarser filling numbers than it is on the finer counts. The loom fixer should be governed according to the actions of the filling yarn and place a sufficient number of bristles or frictions in the shuttle to control those actions.

As previously stated, the loom fixer should make the checking of the shuttle regular routine and do it every time he is called to work on a loom for any purpose. This will certainly prevent him from being called back to looms in many cases and will also increase production and decrease seconds. Relatively little time is required to make this check and any corrections or adjustments which might be needed.

### Important Contributions

The two most vitally important contributions a loom fixer can make towards looking after a section of looms is to keep the shuttles in good condition and to keep them boxing properly. Good shuttles will reduce seconds in the cloth more than any other one single item. Shuttles which are boxing properly will do more to keep the looms in operation than any one single item. Filling breakage and

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looms slamming off are the two things that put the greatest demands on the loom fixer's time. More looms are flagged by the weaver for these two reasons than all the others put together. It is easy to realize their importance.

Among the multitude of troubles caused by the shuttle not boxing properly are slamming off, throwing the shuttle out of the loom, prevention of the filling feeler from working properly, prevention of the battery transfer mechanism from working properly, hung bobbins, bobbin breakouts, and broken shuttles and other parts. In addition, the improperly boxed shuttle causes excessive warp breakage by the prevention of the shuttle from tracking straight on its passage across the lay.

## Boxing The Shuttle

To box the shuttle, the loom fixer should loosen the dagger stop and turn it up out of position. The back box plates should be checked to determine their tightness. The lay end plates should be checked to make sure they are tight. The protector rod should be checked to see if it is set properly. The protector rod fingers should both make contact with the leather strips on the back binders. The daggers should clear the frogs. Place the shuttle against the back box plate and move it towards the shuttle box. Then, adjust the front box plate so as to allow  $\frac{3}{16}$ -inch clearance between the shuttle and the front box plate at the entrance to the box. Push the shuttle into the box until the shuttle spur is one inch from the picker and set the front box plate so that the point of the shuttle will be exactly over the center of the picker stick slot. Check the picker to determine if it is in line with the shuttle point. Parallel the picker with the shuttle point. Make sure that the point of the shuttle is in line with the hole in the picker when the shuttle is all the way up in the shuttle box as well as when the picker stick is at its full forward stroke. Push the shuttle all the way into the shuttle box and adjust the back binder bushing so that the protector rod daggers clear the frogs the required distance before putting the dagger stop back in place. There should be about  $\frac{1}{8}$ -inch clearance between the dagger stop and the dagger when the shuttle is fully boxed. Always be sure that a strip of leather is placed between the dagger stop and the dagger.

Check and adjust the back binder springs, and make sure they have the proper tension. Inspect the check strap assembly and make sure that the strap is properly adjusted and that all parts are securely tightened. There are many moving contacting parts in the various assemblies having connections with the boxing of the shuttle. This makes it necessary for the loom fixer to give this part of his work daily attention in order to keep the shuttles boxing properly at all times. Also a variation in atmospheric conditions often affects the boxing of the shuttles.

Years of practical experience on the job have proved beyond any doubt whatsoever that a loom fixer can contribute greatly towards the successful running of his section of looms by checking over his section at least one time on each shift to determine if the shuttles are boxing properly. This checking can be done in a relatively short time and if he finds it necessary to stop a few of the looms and make minor adjustments it will only require a few

minutes time on each loom. This action will save many times over the time spent on doing these things and, at the same time, will keep the looms in production. Most weave mills operate three shifts and the best way for the loom fixers to maintain properly boxed shuttles is to check over the section at the beginning of each shift. He should do this first, regardless of any other breakdowns.

## Pick Motion

The pick motion and the boxing of the shuttle are so closely related and so dependent upon each other that when either one is inspected and set up, the other should also be checked. When reference is made to the pick motion, it will mean to include all the parts from the pick cam through to the picker. The pick motion is a vitally important part of the loom assembly. The power to motivate the shuttle is derived from or through the pick motion. When the loom is in operation most all of the parts comprising the pick motion are in constant moving contact with other parts. Sufficient power is necessary to operate the loom efficiently but excessive power from the pick motion can, and will, double or triple the loom fixer's work. This is true because it will prevent the shuttle from boxing properly and it will exert excessive strain on many parts of the loom. This strain causes wear and breakage of many parts.

In the early part of the present century, the automatic loom was a crudely built machine compared with the present day looms. They were not built with precision and they were not as automatic in their operation as they are today. The adjustments and settings of the various parts of this earlier loom did not require the precise settings that are necessary with the present day looms. Automatic looms are required to do much more than the earlier looms. They produce more goods by operating at higher speeds and they produce better quality fabrics. These improvements in the automatic loom have been necessary to meet present day demands of the trade and the loom builders have met the challenge and produced the looms for the needs. In doing this they have been forced to build a more substantial and precision machine. They also have been forced to add some new and complicated parts and motions to the looms.

All of these achievements and progress in making a better loom are good but some of the weaving mills are failing to obtain the full benefits from these improvements by failing to train their loom fixers correctly. They are still trying to get along with the old hit or miss guess-work type of loom fixing which got them by in pretty good shape on the earlier looms but will not give the proper maintenance care to present day looms. This is especially true on setting up the pick motion.

On the older looms more time and tolerance was allowed for getting the shuttle across the lay on each pick. If the parts of the pick motion were set up nearly right the loom would operate very well. This is not the case with the later model looms. The shuttle must leave the box on time and arrive in the opposite box on time or the loom simply will not operate efficiently.

To set up the pick motion, the fixer should first turn the crank arm to place the lay on bottom center with the shuttle all the way in the box on the shipper end of the loom. This will place the pick ball on the lowest part of the pick cam and allow the picker stick to drop all the

way back to the end of the lay on the shipper end. Check the left hand parallel to see that it is tight and in place against the rocker shaft bearing. Check the parallel plug. If it is excessively worn it should be replaced. Adjust and tighten the parallel spring. The parallel spring should be tight enough to draw the picker back in place against the check strap after each pick but not tight enough to draw the slack out of the check strap. Adjust and tighten the pick arm. Adjust and tighten the short lug strap on the pick arm and the lug strap connection. Put the long strap in place on the picker stick and tighten it partially to the lug strap connection. Turn the lay forward until the pick ball rests on the extreme high point of the pick cam. This will draw the picker stick forward to its full stroke on the pick.

With the picker stick still in this forward position, adjust the lug strap holder on the picker stick so that the lug strap assembly will be in a level position parallel with the lay. With the picker stick still in this forward po-

sition, adjust the long lug strap to a point where the picker will force the shuttle far enough forward to clear the swell on the back binder. The lug strap should then be tightened securely.

Builders of modern high-speed looms provide gauges for setting the timing of the pick. This important setting should be made with a high degree of precision in view of the effect it has on the operation of the machinery. The older model looms pick when the crank arms are on exact top center position.

The old method of setting up the pick motion was to place the crank arms in position and then set the pick cam before any of the other parts of the pick motion were positioned. That was a more or less hit or miss method because if the pick cam is set first it then becomes necessary to take up or let out on the lug strap. There is no sure way to get the correct and exact timing on the pick unless the pick cam is set after all the other pick motion parts have been positioned.

## Reviewing the fundamentals of WEAVING FOR QUALITY

**This article points out that quality weaving is always the result of the application of teaching the fundamentals to the individual weaver and never the result of capital outlay. It also says that basic fundamentals rule the operation and that these fundamentals must be as firmly instilled as opening your mouth when a fork full of sirloin is lifted toward it.**

**Q**UALITY weaving is based on a series of fundamentals. The fundamentals of weaving must be emphasized and re-emphasized until they are a matter of second nature to every loom operator before quality production can be had for the weave room. Fundamentals are just as important to the weaving operation as they are to a winning football team. For instance, the University of Tennessee's football machines are not always the biggest in size but they are practically always well versed in fierce blocking and act like, if they are not, the originators of gang tackling. Blocking and tackling techniques are drilled and drilled into the players until the fundamentals are as firmly instilled as opening your mouth when a fork full of sirloin is lifted toward it. Tennessee's teams can be had, but the record book shows that it does not happen too often.

What does this have to do with weaving? It is true that weaving is not a team game or a competitive sport but it is also true that basic fundamentals rule the operation. Quality weaving is always the result of considerable application of teaching the fundamentals to the individual weaver. It is never a result of capital outlay alone, although mechanically sound equipment is a necessary requisite. It may best be achieved by conscientious implementation of a well conceived training routine to every weaver whether he is experienced or as green as the back of new money.

Mills running normal fabrics on cam looms with medium to hard twist filling numbers will usually find that warp end breakage causes the majority of loom stops. This is not true in all cases, particularly in soft-filled sheeting operations and in companies which have poorly maintained looms. When a warp end breaks, the loom should stop with the shuttle firmly boxed and the harness level. The end is pieced, with the correct color in case of multi-colored warp patterns, with a weaver's knot and drawn through the correct harness eye and dent in the reed.

The weaver should not poke his reed hook in the reed and give it a half-twist to see how many ends are already drawn in the dent. This action will, of course, spread the dent and will cause a warp streak to be woven in that area. Before starting up the loom the crankshaft should be pulled to back-center. With the loom in this position, the harness are no longer level. However, this action allows a little longer for the loom to reach its normal operating speed before the picker stick throws the shuttle to the opposite box on the first pick after the start-up. The shed closes and opens before the picking motion starts. This motion places an additional power demand on the loom. The weaver should also be cautioned that a good reed hook must be as thin as possible so that open dents are not caused by its use. In addition, the fact that no one should work on reeds with tools other than standard reed pliers should be stressed.

### Shuttle Check

It is well, prior to starting up the loom to pull the check strap on the opposite box toward the center of the lay. This action assures a complete checking action to the shuttle on the first pick after the start-up. The weaver should not lean on or hold his free hand tightly on the face of the cloth while starting up the loom. An additional bow is

placed in the filling as a result of this greater-than-normal tension being held on the cloth. This additional filling bow makes for non-uniformity in the appearance of the fabric.

### Starting Up Filling Breaks

When the filling breaks on a Draper E model loom the shuttle should stop under the battery or in the right-hand box. If the loom should stop on the filling fork but the filling remain unbroken, the take-up ratchet must be advanced one tooth in order to avoid making a thick place when starting up. If the loom should stop a second time on the filling fork without the filling being broken, it is time to flag it for the fixer. It is necessary to advance the take-up one tooth because, even though the filling is not broken the let-back mechanism has acted. This is proper in order to compensate for the effect of a broken pick.

On finding the filling broken, the weaver should turn the loom forward, under its own power, one pick at a time until the broken pick is matched. When this pick is found the weaver should then remove the shuttle from the loom and thread it, after inspection of the quill of filling making sure it is all right. The broken pick may have been caused by the eye being choked or a burr or splinter on the shuttle. A quick inspection of the shuttle should be made by the weaver for these and other items such as bad bristles or fur. If everything looks in proper working order, the shuttle should be returned to its position firmly in the box and the crankshaft reversed to back-center. The loom may be started after pulling the check strap on the opposite box toward the center of the lay. Of course, looms which break filling an excessive number of times should be referred to the loomfixer.

The highly important parts which are played by the filling fork and let-back motion should be understood by every weaver. The great bulk of bad start-ups are caused by either ignorance of or indifference to the actions of these mechanisms. In addition, it should be noted that these parts are not the simplest operations on the loom and adequate instruction time should be given to their significance and operation.

When the filling breaks on the change, the loom should be turned forward until the pick is matched. The take-up motion is advanced, the shuttle is threaded and the crankshaft positioned on back center before starting up the loom. It should also be noted that the looms must all be fixed to let-back uniformly on a filling break. If one loom is set to let-back two teeth and another one tooth per break, and still another will not let back at all, it is obvious that the weaver will be unable to start them up without making thick or thin places. Uniform settings of the looms as well as the weaving procedures must be maintained for quality weaving.

### Slamming With Shuttle In Shed

Sometimes the loom will slam off with the shuttle trapped in the shed. In this case, if the protector motion is set to stop when the reed is at a distance of the width of the shuttle plus 1/8-inch from the fell of the cloth, the loom can be started without damage to the cloth. This is done by positioning the shuttle in the proper box and spreading

out the picks in the area where the shuttle was trapped with the tip of an empty quill. An improper protector motion setting will allow serious smashes when the shuttle is trapped in the shed. A quick inspection by the weaver will show whether the smash was caused by a broken check strap or a quill hung in the lay. If these conditions are as they should be, it is proper to start up the loom. However, if the loom should slam a second time, without apparent cause, it should be flagged for the fixer so that various settings and timings may be checked.

When the shuttle is trapped in the shed and breaks several warp ends in the process it is not difficult to fix the broken ends without making a bad place. Of course, if the roll of cloth on the loom is large enough it should be doffed at the smash and production resumed in a normal manner with a minimum of lost-time. However, on short rolls or where the warp is running out, the broken ends should be tied down. Whenever one or a group of ends are drawn in the tails should be trimmed after the loom has run enough picks to firmly anchor the ends. In the same manner the tails of the weaver's knot should be trimmed if they are not tied short enough. Repair of such a smash is usually done by smash hands and is not part of the weaver's job. Knowledge of when such a repair job is indicated and when the cloth may be doffed is definitely necessary to the weaving trade.

### Inspection Of Cloth By the Weaver

One of the fundamentals which should be part of every weaver's nature is the constant and ceaseless inspection of the cloth being made by the looms on his job. This is true whether the job is running gabardines, denims, upholstery fabrics or soft-filled sheetings. The task is not difficult and it is most necessary. The weaver should always be looking at the cloth.

It is helpful in underlighted weave rooms, which is the case in most of them, for the weaver to carry a flashlight for inspection of cloth. He should observe the face and back of the cloth as well as the ends of the roll (for jerked-in filling) on every loom on his job twice per shift. Some mills require more frequent inspections and others require the weaver to initial the cloth as he inspects. The latter procedure may lead to trouble in cases where the cloth is sold in the greige or with finishing processes which do not remove the markings.

### Patrolling The Back Alleys

It is necessary when searching for the fundamentals of quality weaving to realize that one requisite is good efficiency. The better weavers know that to run good efficiency the back alley must be constantly patrolled. They stay in the back alleys as much as possible straightening out warps and watching for extra ends or ends running out. They are also well aware that warps with crossed selvages are not going to run with any degree of efficiency and that substandard quality cloth is the likely result. Good quality is not made when the looms are running at low production efficiencies. This is always true because of several reasons but certainly the psychology of being behind on the job makes the weaver overlook many of the little attributes which add to the production of good quality cloth.

# Bleaching, Dyeing & Finishing

Reporting on the Sixth Annual

## Chemical Finishing Conference

The National Cotton Council sponsored its sixth annual Chemical Finishing Conference earlier this month at Washington, D. C. The following is a review of some of the highlights of that meeting.

A PANEL on performance standards for wash-wear cottons and two distinguished European speakers provided the highlights of the National Cotton Council's sixth annual Chemical Finishing Conference held in Washington, D. C. on Oct. 2 and 3. A record audience of over 300 textile scientists and technologists participated in the conference.

The panel discussion was opened by the moderator, J. Marshall Cole, vice-president, Cold Spring Bleachery, Yardley, Pa., who summarized the background that led to the presentation of the panel. Mr. Cole said that the National Cotton Council, the sponsor of the meeting, provides a forum for the panel to facilitate a full discussion of the problems involved, with the hope that it would contribute to their clarification and, eventually, to their solution.

In addition to Mr. Cole, the panel members included Dr. Harley Y. Jennings, director of research, Dan River Mills; Charles W. Murphy, merchandise manager of Arrow Shirts, Cluett, Peabody & Co. Inc.; Paul E. DiBianco, assistant manager of converting and quality control, Cluett, Peabody & Co. Inc.; B. L. Lizak, supervisor of quality control laboratory, Montgomery Ward; Dr. George Wham,

technical director of the Good Housekeeping Institute and chairman of the Wash-and-Wear Committee of the American Association of Textile Chemists & Colorists; and Charles E. Grandey, director of the Bureau of Consultation, Federal Trade Commission.

The first panelist to speak was Mr. Lizak, who presented the retailer's point of view. Mr. Lizak said that it is the retailer's responsibility to make sure the merchandise he sells performs as advertised. Thus, in wash-wear garments, the retailer must test the whole garment, not just the fabric from which the garment is made. The retailer must first earn the confidence of the consumer, and then keep it, and this means that he must truthfully tell "Mrs. Consumer" just what the fabric can do and how it behaves. It is high time that the industry stops confusing "Mrs. Consumer" and establishes clear definitions and standards.

The second speaker, Mr. Murphy, said he felt the wash-wear advertising is mis-directed. On the one hand, he said, the men's wear industry is spending a lot of money telling men that they cannot afford not to dress well, and on the other hand, the public is told that wash-wear items need no ironing at all. What should be emphasized is the ease of care, ease of laundering and ease of ironing. Mr. Murphy said that many mill men and finishers make exaggerated claims for their products. Wash-wear garments must be made of quality fabrics, having a quality finish, and must be well manufactured. The retail promotional effort must be based on honesty in claims.

The third speaker's remarks concerned the problems the



The sixth annual Chemical Finishing Conference, sponsored by the National Cotton Council, was held Oct. 2-3 at Washington, D. C. Part of the record attendance of more than 300 is shown here in a question and answer session with Dr. Leon Segal of the Southern Regional Research Laboratories.

converters encountered with the new finishes. According to Mr. DiBianco, these include yellowing, scorching, light-fastness and loss of strength. Tests are needed which consistently correlate with actual performance. Abrasion tests and strength tests, for example, should be so designed as to reflect the resistance to abrasion and strength needed in actual use of the garment. A better test should also be found for determining resistance to creasing, since present tests do not consistently correlate wrinkle resistance with appearance.

Dr. Jennings, who spoke next, emphasized the necessity of caution in establishing standards. He pointed out that the wash-wear finishes are still in a formative stage and new developments are forthcoming. Consumer reaction to such apparel is still unknown. With the cost of finishing chemicals ranging from \$.17/pound to \$1.20/pound, and when even the finishers are not certain what finish is best for what use and fabric, the products vary widely in quality and in price, and it is difficult to set up standards. Dr. Jennings also warned against the neglect of functional properties of garments in a race for better appearance.

Mr. Grandey offered the services of his bureau to the industry if it should desire to establish a voluntary code on performance standards. Self regulation is the best regulation, he said. The staff of the Federal Trade Commission will be glad to co-operate with representatives of the industry to develop fair trade standards which will protect the great majority of its honest members from an occasional "fast buck" operator. The F.T.C. cannot legislate, but it can issue restraining orders, and these are usually upheld by the courts.

The last panel speaker, Dr. Wham, gave a progress report on the A.A.T.C.C. wash-wear committee's work on development of a test of appearance, or freedom from wrinkles. The suggested test procedures are being evaluated in a very large number of co-operating firms and laboratories. Dr. Wham emphasized that tests must be developed before standards can be established, that in fact standards can be set only in terms of results of acceptable and reproducible tests. The evaluation of the test is expected to be completed by the end of this year.

A general discussion followed the panel's presentation, with questions being asked by both the audience and the



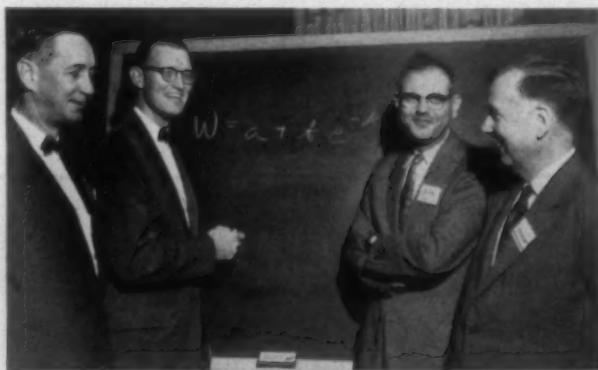
Speakers at the afternoon session of the first day of the Chemical Finishing Conference at Washington's Statler Hotel included (left to right) B. G. Simpson, Dow Corning Corp.; Fred Fortess, Celanese Corp. of America; Robert T. Graham, National Institute of Drycleaning; and Dr. J. David Reid, Southern Regional Research Laboratory.

panelists. An example of the second was a question by Dr. George Wham, who asked the representatives of various companies present in the audience whether they will support wash-wear standards if such could be developed. Mr. Cole answered this question, saying that since this work is but in the exploratory stages, it is too early for anyone to make definite commitments. However, the fact that the Wash-Wear Committee of A.A.T.C.C. receives such extensive co-operation from the industry speaks for itself.

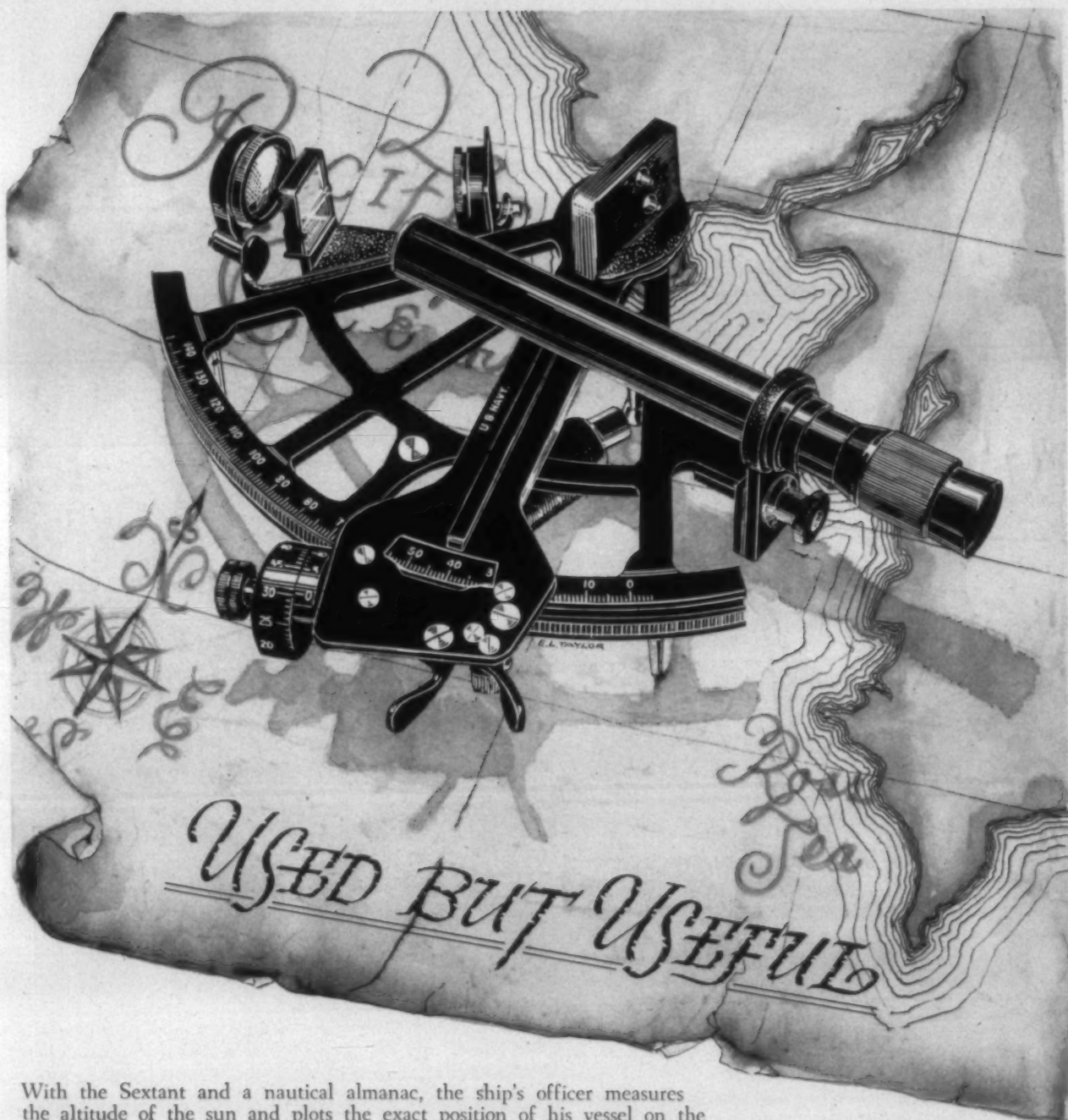
Of other questions, the one posed by Dr. Leonard Smith of the National Cotton Council evoked general comment. The question was whether a standard, once adopted, would not act as a kind of ceiling, so that manufacturers would make products just good enough to meet the standard. The consensus of opinion on the subject was that a standard is a minimum, and should be considered a floor, not a ceiling. Furthermore, a standard could be so defined that it would allow for product differentiation and encourage the utilization of new processes and improvements.

The wash-wear theme of the panel discussion was carried in a number of papers presented at the conference. The authors, their professional affiliations, and the titles of their papers were as follows: J. David Reid, Southern Regional Research Laboratory, U. S. Department of Agriculture, "Durable Creasing of Wrinkle-Resistant Cottons"; Robert T. Graham, National Institute of Drycleaning, "Progress Report on Garment Treatments"; B. G. Simpson, Dow Corning Corp., "The Effect of Silicone Softeners on Resin-Treated Cottons"; Melvin D. Hurwitz, Rohm & Haas Co., "Dialdehydes as Cotton Cellulose Cross-Linkers"; James B. Irvine, Quaker Chemical Products Corp., "Acetal Cellulose Reactants"; Richard Steele, Rohm & Haas Co., "Factors Affecting the Drying of Cotton Apparel Fabrics." Fred S. Perkerson, Southern Regional Research Laboratory; Fred Fortess, Celanese Corp. of America; and Thomas D. Hawley, United Merchants Laboratories, served as session chairmen. J. Marshall Cole served as general chairman of the meeting, in addition to moderating the panel discussion.

In a report on preliminary test work performed at S.R.R.L., Mr. Reid discussed the re-curing process suggested by Dr. George Buck and Nelson Getchell of the



Some of the principals at the opening session of this year's Chemical Finishing Conference were (left to right) Dr. Fred S. Perkerson, Southern Regional Research Laboratory; Dr. Richard Steele, Rohm & Haas Co.; Dr. Leon Segal, S.R.R.L.; and Dr. A. R. Urquhart, The British Cotton Industry Research Association.



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National Cotton Council. Results were somewhat confusing, he said, but the test indicates that cotton treated with dimethylol cyclic ethylene urea may be re-cured with good results. More experimental work is necessary, however, before optimum conditions, important for commercialization of the process, can be determined.

Reporting on another aspect of work performed at S.R.R.L., Mr. Reid said that a number of truly wash-wear garments has been produced there. Among them are a shirt that is still presentable after 51 hand washings with no ironing; a pair of sport denim trousers which maintained a good crease after 18 machine launderings; and a dress with wide box pleats which look after laundering as if they were freshly ironed.



Perkerson, Cole, Hawley, Fortress

J. Marshall Cole, general chairman of this year's Chemical Finishing Conference, is shown here consulting with Dr. Fred S. Perkerson, chairman of the opening session; Dr. Thomas D. Hawley, United Merchants Laboratories, session chairman; and Fred Fortress, Celanese Corp. of America, session chairman.

The wash-wear qualities are imparted to these garments by treatment with a resin formulation comprising dimethylol cyclic ethylene urea, an acrylic polymer, silicone and catalysts. Chemical costs of the treatment were low, averaging two to four cents per garment, but labor costs were comparatively high. However, if the treatment is performed on commercial drycleaning equipment, the costs seem reasonable. Mr. Graham estimated that the costs of treating a cotton cord suit, including cost of chemicals and overhead, but not profits, would be \$1.74 if the trousers were pleated, and ten cents less if they were not. The cost of treating a plain cotton short sleeve sport shirt would be about 90 cents.

While no garments were as yet treated in the N.I.D., Mr. Graham feels, on the basis of experiments with various cotton fabrics, that the process is technically feasible. A tentative procedure, involving impregnation with the resin to a 75 per cent wet pick up, drying, curing on a press, and post-curing in a hot-air cabinet, was evolved. The resin formulation used was a water solution containing 14 per cent cyclic urea resin, five per cent of acrylic resin, two per cent silicone emulsion, 1.25 per cent metal salt catalyst, 0.4 per cent catalyst for the silicone, and 0.1 per cent non-ionic surface-active agent.

Treatments with crease-resistance imparting resins, necessary for wash-wear, also result in diminishing of extensibility of the fiber and thus in lowering of tear strength of the treated fabrics. An increase in inter-fiber lubricity is a partial solution to this problem. The function of softeners is to impart this increase in lubricity, and the extent of the increase is a measure of the effectiveness of the agent.

A good softener must also possess other qualities: it must be durable, may not discolor the fabric, and if it is to find commercial use it must not be expensive. Mr. Simpson reported on the results of a series of experiments in which a 39-inch, 80/80, 4 ounce/yd mercerized cotton print cloth was treated with various crease resistance imparting formulations and compared with regard to tensile strength, flex abrasion, wrinkle recovery and sewability. Most of Mr. Simpson's work was done with three typical blends of dimethylol ethylene urea resin. Each of the three resin blends was used in conjunction with four or five softeners. Of the softeners, the work was limited to one anionic, one cationic, and one non-ionic organic softener, and silicone emulsions. The silicone emulsions comprise blends of two silicone polymers, dimethyl siloxane and methyl hydrogen siloxane. The first is said to contribute to the lubricating effect of the blend, due to its many methyl groups, while the other contributes mainly to the durability of the finish, by hydrolysis and condensation of some of the available silane hydrogens with hydroxyls on the cellulose and formation of oxygen bridges. Mr. Simpson's data indicates that the silicones are generally superior to organic softeners in tear strength, wrinkle recovery values, and as sewing lubricants; they are slightly inferior in tensile strength and flex abrasion values.

Softeners, even the best ones, can only partially compensate for the loss of tear strength and other physical properties that result from lowered extensibility of cotton fibers in which the cellulosic chains are cross linked with conventional crosslinking resins. It has long been the aim of chemists working on this problem to develop a resin which would crosslink the cellulosic chains in cotton fibers so as to improve their crease resistance without diminishing their extensibility. The lowering of extensibility upon crosslinking has been attributed to shortness of the crosslink. Mr. Hurwitz reported on a study undertaken to determine the effect of chain length in a series of dialdehyde cellulose crosslinking agents. The materials used were glyoxal, glutaraldehyde and L-hydroxyadipaldehyde, with two, five and six carbon atoms, respectively. The results of this investigation indicate that there is no significant difference between the effects of these compounds as crosslinkers. Mr. Hurwitz explains this by assuming that in all cases when an aldehyde group of the crosslinking agent reacts, it reacts with two hydroxyl groups on two adjacent cellulosic chains, forming crosslinks whose length is the same as the length of linkages obtained by crosslinking with formaldehyde, i.e., a three-atom linkage. The length of the chain between the two aldehyde groups in the dialdehyde has no effect on the length of the crosslink.

Mr. Hurwitz then worked with two compounds having essentially the same structure but different chain lengths between the reactive groups. He thought that these compounds would provide the desired information. Dimethylol ethylene urea, which gives a crosslink seven atoms long, and dimethylol ethylene bis (ethylene urea), which gives

a 12 atom crosslink, were used. Data obtained indicate little significant improvement in favor of the longer crosslink.

According to Mr. Irvine, however, tensile losses do not always result from crease resistance imparting resin treatment. Mr. Irvine stated that a modified glycol acetal resin, which imparts medium crease resistance, gives almost no tensile loss. But the primary advantage of the acetal cellulose reactants is the fact that they cannot pick up chlorine. There is no nitrogen in these molecules. Among other advantages of these compounds is durability. Mr. Irvine claims that they are so resistant to hydrolysis that "when they are gone the fabric is gone too!" In addition, fabrics treated with these compounds suffer no reduction of abrasion resistance and in absorption capacity. It is also possible to obtain various types of hand.

The cost of finishing is said to be of the same order as that of finishing with other resins.

The acetals discussed are rather simple polymeric acetal condensation products, prepared from two moles of an alcohol and one mole of an aldehyde. Under conditions of textile fabric curing those products may be said to fragment and to form crosslinks by transacetalization.

Factors affecting the drying of cotton apparel fabrics must be considered in a discussion of the wash-wear cottons. According to Mr. Steele, the water-holding capacity of the fabric determines the amount of water that must be evaporated during the drying operation. It is therefore the most important factor determining drying time. Chemical treatments of the fabric can affect its water-holding capacity and thus its drying time. Mr. Steele discussed three types of finishes: water repellents, reactant resins and surface

resins. A treatment with the repellents is very effective in reducing the water capacity of a fabric; the amount of water held by the treated fabric is reduced to a fourth or a fifth of that held by untreated fabric. Water which behaves as if it were held in continuous capillaries in the fabric is almost entirely eliminated, and that which behaves as if it were held in non-continuous capillaries (water held in such capillary systems as those formed when two fibers touch each other) is also strongly diminished. Only the water held within the fibers is not affected significantly. The reactant resin is a good bit less effective, and acts only on the non-continuous capillaries. The surface resin is about as effective as the reactive resin. This effect is attributed to spot welding of the fibers, so that the fabric structure cannot expand and open up as the fibers swell. In this manner the total water capacity could be reduced while good absorbency for smaller amounts is retained, which may be of use, for example, in an underwear fabric. A combination of these and other treatments could possibly give a cotton fabric having a lower water-holding capacity and yet retaining the primary advantage of cotton absorbency.

Oil and water repellency is not usually thought of as a factor in wash-wear, but the improved resistance to both water-based and oil-based stains can play an important part in satisfying the demand for garments that are easy to care for and keep clean. Treatment with fluorochemicals can impart this property to cottons, according to Messrs. Segal, Loeb and Clayton of S.R.R.L., who wrote a paper entitled, "Oil and Water Repellent Treatment for Cottons with Fluorochemicals." Two fluorochemical treatments were

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used, the chromium complex of perfluoro-octanoic acid, and the latex of poly (1,1-dihydroperfluorobutyl acrylate). Both gave satisfactory repellences, affected tensile properties but slightly, and both are commercially available. Two cotton constructions—80/80 print cloth and 8.5 oz. sateen—were made repellent to mineral and vegetable oils as well as water. The construction of the fabric had a marked influence on the effectiveness of the treatment. Sateen and whipcord continually required heavier application of fluorochemicals to obtain the repellency easily obtained with lighter constructions. Where treated fabrics were partially wetted by oils, the data indicated that hydrocarbon mineral oils wet more quickly and easily than the glyceridic vegetable oils. It is suggested that low surface tension is not the only factor of importance with fabrics treated with fluorochemicals. The volatility of the liquid is the other factor of importance. A vaporization-condensation process could easily account for the relative ease with which solvents wet and penetrate these treated fabrics.

Of the two contributions from abroad, one, presented by Dr. A. R. Urquhart and titled "Reactivity of Cellulose," was rather theoretical. The other, by Dr. Georg Heberlein, on "Versatile Cotton in High Style Finishing," was strictly factual and descriptive.

Dr. Urquhart, of the British Cotton Industry Research Association, discussed the reasons underlying the great differences of reactivity of samples of cellulose that are identical chemically. Moisture absorption studies exemplify these differences. On the basis of a postulated mechanism for the reactions that take place in a cotton fiber on water absorption and desorption, Dr. Urquhart built a theory that accounts for them in terms of variability of reacting groups in the cellulose molecule. During desorption and absorption, the number of hydroxyl groups available for the attachment of water decreases and increases respectively, but with a lag during absorption. Thus the reactivity of cellulose can be increased by treatment with water at high temperatures and decreased by heating in absence of water.

Similarly, treatment with sodium hydroxide solution swells the cellulose, makes available a larger number of

hydroxyl groups and thus, since most reactions of cellulose are those of its hydroxyl groups, it makes it also more reactive. Compared with ordinary cotton, mercerized cotton has about 50 per cent greater availability of hydroxyl groups, and regenerated cellulose about 100 per cent greater. This picture fits most reactions of cellulose. However, if these materials are subjected to ordinary acetylation, instead of finding that the rate of acetylation increases more or less in conformity with the availability of hydroxyl groups, we find in fact that mercerized cotton acetylates much more slowly than ordinary cotton, while regenerated cellulose cannot be acetylated at all in a reasonable time.

Dr. Urquhart explained this apparent contradiction by postulating that although mercerized cotton and regenerated cellulose contain greater proportions of amorphous cellulose than the native material, the amorphous regions may be more crosslinked, or more strongly crosslinked, by hydrogen bonding. In aqueous media, or when water vapor is absorbed, these bonds will be broken. Hence, in reaction in aqueous systems the expected order of reactivity is found. But in the anhydrous system used for acetylation these bonds may very well remain unbroken, and the normal order of reactivity is reversed. Dr. Urquhart emphasized that this explanation is speculative, and that it would have to be tested by studies of the reactivities of these celluloses in media varying in their power to break the postulated bonds.

The second of the foreign speakers, Dr. Heberlein, the managing director of Heberlein & Co., Switzerland, really proved the truth of the title of his paper. While much of the recent work on cotton is aimed at improving its functional properties, stated Dr. Heberlein, it must not be forgotten that cotton's versatility makes it particularly suitable for creation of high style fabrics. Cotton lends itself to a greater variety of finishing methods than any other fiber, and by combining two or more finishing treatments, an unlimited number of fashion effects can be obtained. Dr. Heberlein surveyed methods used in actual plant operation for finishing of cotton goods for special fashion effects, and discussed and illustrated many examples of fabrics prepared in such a manner.

### Use Of Non-Wovens Expected To Be Widespread

The use of non-woven fabrics is expected to be greatly expanded in the next ten to 15 years. A report by the old line factoring firm of William Iselin & Co. Inc. indicates that the fields in which headway seems to be most apparent are apparel, interior decoration, of both homes and autos, shoes and floor coverings. One of the main obstacles to still greater progress, says the company, seems to be the lack of adequate information and communication. This is no doubt due to the rapidity with which new uses for both man-made and natural fibers have been developed in recent years. Many new processes are being developed in many fields at the same time and each usually calls for special treatment in both handling and finishing, the company said.

While most of the firms engaged in the new field are said to be aiming at large potential markets, the job of educating consumers concerning the benefits of non-wovens is still largely ahead. Despite the obstacles and problems that confront the industry as a whole, the study concludes, textile leaders are pretty well in agreement that in ten or 15 years, perhaps even sooner, use of non-woven fabrics will be widespread for many diversified products.



Participating in the technical session held the second day of the Chemical Finishing Conference were (left to right) James B. Irvine, Quaker Chemical Products Corp.; Dr. Georg Heberlein, Heberlein Co.; Dr. Melvin D. Hurwitz, Rohm & Haas Co.; and Dr. Thomas D. Hawley, United Merchants Laboratories.

## MODERN TEXTILE MOTORS

By J. B. WREN, Westinghouse Electric Corp., Buffalo, N. Y.

This paper, delivered before the Fall meeting of the American Society of Mechanical Engineers in Hartford, Conn., Sept. 23-25, deals with the use of a.c. motors in the textile industry with emphasis on the mechanical features required in many applications. Evolution of the present-day loom motor and the lint-free fan-cooled motor is also described. The paper points out that the textile industry is one of the largest users of electric motors in the U. S. and that this industry has more installed horsepower than any other in the country.

THE textile industry is one of the largest users of electric motors in the U. S. It has been said that this industry represents more installed horsepower than any other in the country. By far, the majority of these motors are of the integral horsepower size and of the polyphase, alternating-current, squirrel-cage, induction-motor type. This is the simplest type of electric motor. The stator windings of copper are carried in a laminated steel core to provide the electric field. The rotor is made up of a laminated steel core in which the current-carrying bars and end rings are die cast (usually of aluminum) in the form of a squirrel cage. The rotor, supported by bearings to permit rotation, develops torque to do the work required of it. These parts are held in the other members called a frame and end brackets, the configurations of which allow mounting in any manner desired and provide protection for the motor itself.

### Types Of Enclosure

The various degrees of enclosure of a motor are determined by the amount of protection the frame and end brackets provide. The National Electrical Manufacturers Association, better known as N.E.M.A., has defined in the "Classification According to Mechanical Protection and Methods of Cooling," section MG-1 of its motor and generator standards, the two basic enclosures for motors and several modifications of each. "An open machine is one having ventilating openings which permit passage of external cooling air over and around the windings of the machine."

In the textile industry, motors in this classification are the lint-free motor, the textile screened motor and the vertical twister motor. The lint-free motor is an open motor specifically designed for textile mills. The motor has double-end ventilation and is characterized by its special

air passages. The end brackets are streamlined to a smooth contour. The rotor and its cooling fins are specially designed to pull the lint-laden air in through the brackets and move it through the air passages without clogging. The windings are of special design, being built up with a plastic filler to present a smooth surface so the air will pass over the coils and out through the exhaust openings. This motor is self-cleaning.

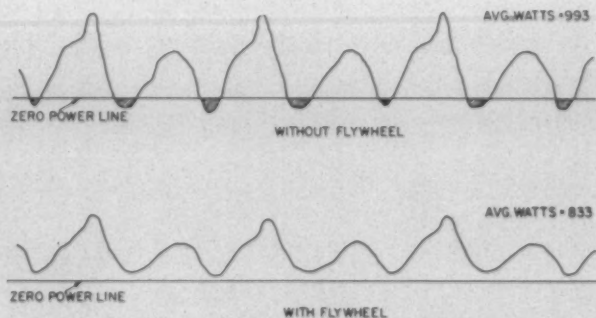
The textile screened motor is essentially a motor with a standard drip-proof enclosure modified by the addition of screens over the air-intake openings to prevent the entry of lint into the motor interior. This type of motor requires the periodic removal of matted lint from the screens to allow proper ventilation.

The twister motor is usually a vertical motor of special short length and smaller than normal frame diameter because of space requirements. These motors are used in areas where lint is not a problem and are cooled by a double-end ventilation system.

The N.E.M.A. standards say, "A totally-enclosed machine is one so enclosed as to prevent the free exchange of air between the inside and the outside of the case but not sufficiently enclosed to be termed air tight." In the textile industry, motors in this classification include the totally enclosed non-ventilated, the totally enclosed fan-cooled, the totally enclosed pipe-ventilated, the totally enclosed water-cooled and the totally enclosed water-air cooled machine.

The totally enclosed non-ventilated motor is one not equipped for cooling by means external to the enclosing parts. In other words, the motor is cooled entirely by the radiating ability of its outer surface. Loom motors and card motors as well as most motors two h.p. and smaller used in the textile mill are totally enclosed non-ventilated.

The totally enclosed fan-cooled motor is one equipped



The relative values of power input required to drive a typical loom using the same motor with flywheel and without flywheel.

for exterior cooling by means of a fan integral with the machine but external to the enclosing parts. Fan-cooled motors for textile applications must be capable of operation without becoming clogged with lint. The fan-cooled motor for the Gwaltney spinning frame has been in production for some time and recently the standard lint-free fan-cooled motor has been made available.

Some of the more special enclosures defined by N.E.M.A. and used in this industry in some applications are the totally enclosed pipe-ventilated, the totally enclosed water-cooled, and the totally enclosed water-air cooled. These terms are fairly self-explanatory. Analysis of these installations has shown that the additional expense involved is justified. In some cases, the ambient air is not suitable and cooling air must be piped into the motor from some acceptable source. The heat from the motor losses may be objectionable in the immediate vicinity and must be removed by piping the warm air away or by water-cooled heat exchangers.

In general, every motor used in textiles must be capable of continued, successful operation in temperatures and humidity higher than normal with the added hazard of lint. If the motors are open, the lint-laden cooling air must either pass through the motor without clogging the passages, or be screened of lint before entering the motor. If the motors are enclosed, fan-cooled types must allow the lint to pass through and the non-ventilated motors should not be adversely affected by a build-up of lint on the outer surface.

### Applications

In the textile field, there are numerous applications where some specific mechanical and/or electrical feature is required. Many motor drives in a mill must be lint-free but require no special electrical design. Included among these would be the opener, picker, blender, cleaner, distributor, condenser, lapper, comber, winder, spooler, warper, etc.

A cotton card requires a motor with exceptionally high starting torque for its size. This is in order to accelerate the larger cylinder in approximately 30 seconds to its proper running speed. At rated speed the load is constant and a low slip-speed characteristic is desirable. The more recent applications of motors to cards require that they be mounted within the arch of the card. This places a restriction on over-all length and diameter of the motor. Card motors have been supplied in the lint-free type, but most are now supplied as totally enclosed non-ventilated with a 40° C. temperature rise.

A roving frame in its operation requires an easy start in order not to break the roving. Special motor designs are available to provide just the proper amount of torque for starting the frames. These motors are subject to considerable lint and must be lint-free whether open or T.E.F.C.

Spinning-frame motors must operate in very linty atmospheres. The open lint-free motor has been used on this application for many years. Several recent installations are equipped with the newer lint-free fan-cooled motor. Space is always valuable in the textile mill. When these motors are mounted in the aisles, length is important. The

smaller diameter of the newer lint-free fan-cooled spinning-frame motor has permitted some installations to be made with the motor under the frame.

Twister motors are not exposed to linty conditions like the roving and spinning-frame motors. Mounted vertically, they are short in length and smaller in diameter than a standard motor of the same rating. A special flange bracket is provided for mounting on the twister frame.

Loom motors are of rugged mechanical design to withstand the shock loads imposed upon them. In addition, an electrical design of the proper torques and slip is combined with the optimum value of inertia in the motor to give the over-all performance demanded of this motor. The whole package is then placed in as small volume as possible for space limitations.

### Loom Motors

The loom motor is always a totally enclosed non-ventilated motor to prevent lint from coming in contact with the windings and rotor. Normally, enclosed motors are rated 55° C. temperature rise on the windings but loom motors are specially designed for 40° C. rise. This gives a cooler running motor with extra capacity. For many years, the loom motor was built using waste-packed sleeve bearings. The rotors were of brazed construction; that is, the individual rotor bars of copper were brazed to the end rings of copper or brass. The diameter of the rotor was such as to give what is now considered a moderate amount of fly-wheel effect.

### Motor Servicing

The servicing of these motors meant the periodic addition of oil to the bearing wicking. The use of oil in this manner and the overflow of the excess oil was a constant source of dirt. This was an ever-present hazard in keeping the yarn and cloth clean. This led to a demand by some mills for loom motors with grease-lubricated anti-friction bearings.

About the same time, the electrical manufacturers were in need of a redesign in order to use their current production facilities. This led to the introduction, about 1950, of the loom motor using basic N.E.M.A. motor parts. This meant that the standard frame and stator electrical parts with a special winding to suit the requirements and the standard diecast rotor could be used. The end brackets and shafts were of special design to meet the required short length and mounting dimensions. Pre-lubricated ball bearings were used. Even though thousands of these motors are in operation today, experience has pointed up the need for consideration of many modifications in design.

It is a well-known fact that, on a pulsating type of load such as produced by a loom, a high-slip motor is more efficient than a low-slip motor. Accordingly, some of the loom-motor designs at this stage were made with this lower speed characteristic. However, even though this design could be shown to be more efficient, the motor with lower slip and lower efficiency was required so that existing production standards would be met in the mill. In this same respect, the addition of inertia to the motor rotor will give a higher average speed and lower power input or better efficiency. There is a practical limit for the amount of  $WR^2$  that will be beneficial, beyond which, there is little gain in performance. However, any large increase in fly-

wheel effect results in higher peak stresses in motor parts, loom parts and the gearing. These stresses under certain conditions can cause failures of parts or malfunction of the loom.

The modern loom motor now has a proper balance of flywheel effect and slip. The increased inertia is provided by the addition of a flywheel mounted as an integral part of the rotor.

#### Braces Necessary

Because of the excessive vibration usually associated with a loom, all parts must be braced and held tightly. Stator windings have been known to fail due to insulation breakdown because of the continued vibration of one strand of wire against another. Unsupported sections of windings or even individual strands of wire have crystallized and eventually broken apart to produce open circuits.

The modern loom-motor windings are now laced tight

carefully, making certain there are no loose wires or coils, and given special varnish treatment to provide extra strength and compactness. The frames, feet and end brackets of the motor must withstand the terrific pounding from the loom day and night. Measurements taken on actual installations have shown accelerations up to 10 G in magnitude in all three directions, horizontal, vertical and lateral. Thus, it can easily be seen that a weak section of a bracket or a foot with a bolt loose or missing can soon give trouble on this application.

Loom motor shaft extensions are now provided with profiled or round end keyways and round end keys to fit. With this design the key nests in the keyway properly giving a good pinion fit and eliminating the possibility of high stress concentration. It has been found that the use of inferior pinions which were bored off center has caused shaft breakages.

Loom motors also have oversize medium-series bearings. Bearing housing tolerances being held to 0.0003 inches

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give a maximum of 0.0008 inches possible looseness between bearing and housing and provision for clamping the outer races in the housings. To allow both bearings to be locked in their housings and to provide extra capacity in the pinion end bearing a cylindrical roller bearing is now used in the pinion end of loom motors.

### Clutch-Brake Loom Motor

A comparatively recent development in the loom motor field has been the introduction of the clutch-brake loom motor. The clutch and brake on the slow-speed crankshaft of the loom have always been major maintenance items. By placing the clutch and brake on the high-speed shaft within the motor, the loom has been cleaned up, the actual construction of the clutch and brake simplified and better control of the operation has been obtained.

Another important advantage of the clutch-brake motor is that it removes the clutch and brake from the grease and dirt associated with the gearing and crankshafts on the looms. Maintenance is now considerably reduced. If servicing is required on the clutch, brake or motor it is now possible to replace the whole unit to get the loom back in production immediately, while repairs are made on the defective parts.

### Lint-Free Motor

The open lint-free textile motor was introduced about 25 years ago and has had excellent acceptance throughout the industry. Briefly described in the foregoing, the motor has a wide-open construction. The skeleton frame is without any shell or cover for protection, providing only a streamlined ring in which is mounted the stator core and streamlined arms to mount the end brackets. The brackets have large openings for the ventilating air to enter and are generously proportioned to give a smooth air flow through the interior.

The surface of the brackets and frames are glossy smooth to prevent any build-up of lint. The windings held in the stator core are insulated with conventional varnish and then enclosed with a plastic filler to present a smooth rounded exterior surface to the cooling air and the lint in it. The rotors are specially designed with smooth fins to shed lint as they move the ventilating air in and out of the motor interior.

The pre-lubricated ball bearings were first introduced in electric motors in this lint-free design. Since then we have seen the usage of pre-lubricated sealed ball bearings spread to all applications. The original installations of lint-free motors with pre-lubricated bearings are still running in Southern mills. Recent examinations show the bearings to be practically as good as new after all these years. The basic design of this lint-free motor has not been changed over the years and it is still sold in large quantities.

### Totally Enclosed Motors

The openings in the standard lint-free motor have long offered some hazard. This is especially true where the motors are used in areas subject to dropping objects or to moisture. The exposed windings covered by the plastic filler can be damaged by a sharp blow. Excessive moisture can prove harmful to the electrical insulation.

For some time, the A.I.E.E. and fire insurance companies have been advocating the use of totally enclosed motors in the textile mills. On the smaller ratings, the totally enclosed non-ventilated motor has been successfully used in many applications for some time.

On the larger ratings, the use of the non-ventilated enclosure has been prohibited by the necessarily large frame sizes required to cool the motors adequately. On the other hand, the totally enclosed fan-cooled motors have not been capable of operating in a linty atmosphere without clogging the ventilation passages and fans. Without the proper ventilation, this motor overheats and eventually fails. Several attempts have been made over the years to make a lint-free fan-cooled motor, but none was too successful. There has been resistance to their use by the textile mills. Since they were not truly lint-free, their size was no advantage, and since the cost was higher, the textile user simply was not interested.

Recent developments by the electrical manufacturers and some changes in thinking by textile mills have brought about the introduction of the new totally enclosed lint-free fan-cooled motor. The advantage of the totally enclosed motor in protection of the windings and other parts of the motor and the easier maintenance problems associated with them are beginning to make an impression on the textile mills.

The recent rerating program in the 180 to 320U N.E.M.A. frame sizes has provided the basic fan-cooled motor with a smaller diameter than the corresponding rating in the open lint-free design. Electric manufacturers have concentrated on modifying this basic fan-cooled motor so that it now has the lint-free characteristics so long desired.

One version of this modification replaces the standard fan-cooled end bracket and blower hood with a specially streamlined combination of bracket, hood and protective cover. The standard bracket is of relatively short length with fins or air straighteners on its outer surface. The standard hood enclosing the blower is held to the bracket by long bolts passing through the air stream. The air intake is covered by a grill with fairly small openings. These are all potential sources of lint build-up.

### Experimental Bale Wrapping To Be Tested

Nearly 7,500 bales of cotton will be wrapped in experimental materials under the National Cotton Council's packaging research program for 1957. The specially wrapped bales will be followed from the gin through marketing channels to the spinning mill in an effort to gather information for the industry to use as a basis for improving the American bale package. Approximately 25,000 bales have been involved in the program which has been in operation for six years.

A total of 17 gins in six states are participating in the research program this year. Some 6,500 bales will be wrapped in 12 ounce burlap laminated to a one mil polyethylene film. The film has  $\frac{3}{4}$ -inch perforations on four-inch centers to permit moisture transfer.

Knitted paper fabric will be used as the wrapping for some 850 bales. The material allows a free moisture transfer yet gives maximum protection. The work involves bales which are both compressed and flat gin standard density. Other materials are being tested on a smaller scale even though previous work has shown the burlap laminate and knitted paper to be most promising.

## PERSONAL NEWS

Drs. Giuliana C. Tesoro and Morton B. Epstein have been named to new research staff positions at Onyx Oil & Chemical Co., Jersey City, N. J. Dr. Tesoro, who moves



Dr. Tesoro

Dr. Epstein

from assistant director of research to associate director of research, received her Ph.D. degree from Yale University in 1943. After working for one year as a research chemist with American Cyanamid Co., she joined the Onyx staff. Later she became head of the organic research department and in 1955 was appointed assistant director of research. . . . Dr. Epstein's new post is that of assistant director of research. He earned his Ph.D. at the University of Illinois in 1942. He joined the company in 1954. Prior to his new appointment Dr. Epstein was head of the applications research department.

Eugene Langford, assistant overseer of sewing, Hillside Plant, Hillcrest Division, Callaway Mills Co., LaGrange, Ga., has been named overseer of carding. He was first employed by the company at its Unity Plant in 1946. He later worked in the synthetic spinning unit, research and development division, and the textile laboratory. Mr. Langford was overseer of the twisting and winding department in the company's Walway Plant in 1956.

Alexander J. Maino has been appointed general manager, Neisler Mills Division of Massachusetts Mohair Plush Co. Inc., Kings Mountain, N. C. He was previously vice-president in charge of production, Wuregan (Conn.) Mills. Mr. Maino is a graduate of Northeastern University and he obtained a law degree from Suffolk University. The Neisler Division includes two plants in Kings Mountain and others at Pageland and Mayo, S. C., and Double Shoals, Ellenboro and Shelby, N. C.

S. T. Anderson, superintendent of the Bedspread Mill, has been named assistant to the manager of the mill which is part of Fieldcrest Mills Inc., Spray, N. C. He has been superintendent since 1946 and was previously assistant superintendent for a number of years. Mr. Anderson has been

with the company continuously since 1917.

. . . Frank E. Barron, who has been assistant superintendent of the Bedspread Mill, has been named superintendent, succeeding Mr. Anderson. . . . Don Rice, formerly foreman of weaving and preparation at the textile division, U. S. Rubber Co., Winnsboro, S. C., has been named foreman of the company's Towel Mill weave room.

Dr. Leland S. Liang, head of marketing research, Werner Textile Consultants, has been re-appointed as a special lecturer on marketing of textiles and apparel at the Bernard Baruch School of Business Administration of the City College of New York for the Fall term of 1957-58.



Robert T. Stevens

Robert T. Stevens, president, J. P. Stevens & Co. will be among those honored by the Protestant Council of the City of New York at a testimonial dinner Oct. 28 at the Hotel Sheraton-Astor, New York City. Mr. Stevens will be cited for his activities as president of Religion in American Life, an interdenominational organization which promotes religious observance among all faiths.

Laurence Scott has been named quality control manager of the Textile Division of The General Tire & Rubber Co., Toledo, Ohio. In the newly-created post, Mr. Scott will head the quality control department which will conduct an expanded plant-wide quality control program. Quality control formerly was a function of the process control department which Mr. Scott headed. He began his career with the division in 1939 as a production worker. He has served in various executive capacities in personnel and as administrative assistant to the manufacturing vice-president. In 1950, he was named superintendent of the coated fabrics operation. Mr. Scott is a graduate of the University of Toledo.

George R. Vila has been designated a group vice-president of the U. S. Rubber Co. His group includes the textile division. He was formerly vice-president and general manager of the chemical division.

E. F. (Ted) Hayes has been elected executive vice-president of Riggs & Lombard Inc., Lowell Mass. Mr. Hayes was formerly vice-president and general manager of Tal-

bott Mills and Massachusetts Mohair Plush. He will make his headquarters at Lowell where the company manufactures a complete line of machinery and accessories for textile finishing.



George L. Abbott

George L. Abbott, former president of the Warren Belting Co., Worcester, Mass., has been elected president of Graton & Knight Co. Inc., Worcester. Graton & Knight recently acquired Warren Belting. Mr. Abbott was vice-president and general sales manager of Graton & Knight from 1939 to 1946 when he joined Warren as president. . . . Hans Anderson, product and sales engineer for Warren prior to its acquisition, will become the general manager of the company. He was in charge of product research for Graton & Knight for 27 years before joining Warren.

Three brothers, Robert Lee, William Madison and Joseph Lewis Tucker, are celebrating their golden anniversary as employees of the Pepperell Mfg. Co., Lindale, Ga. The length of service of the brothers totals 150 years. Robert is the older brother and works as overseer of the spinning department on the second shift. The in-between brother, Madison, is employed as a supervisor in No. 1 spinning room on the first shift. The younger brother, Joseph, is the second hand in No. 2 spinning room on the first shift. The three brothers went to work for the old Massachusetts Cotton Mills in Georgia on Oct. 9, 1907.



Howard Barton

Howard Barton of Fieldcrest's engineering department has completed 40 years of continuous service with the company. He has held various positions of responsibility including that of assistant manager of the old Nantucket and Lily mills, plant manager of the Lily Silk Mill and superintendent of the Synthetic Fabrics Mill for 15 years. Mr. Barton has been in the engineering department since 1953.

R. H. Jackson has been named general sales manager of the Eastern division of Clinton (Iowa) Corn Processing Co. He

## PERSONAL NEWS

has been with the company since 1939 and will continue to make his headquarters in New York City. . . . R. H. Boegel has been named district manager in charge of the Philadelphia, Pa., territory for Clinton. He has been with the company since 1947.



Charles E. Daniel

Charles E. Daniel, chairman, Daniel Construction Co., Greenville, S. C., and a builder of mills and director of many textile firms, received the second annual good citizenship award of the Greenville Chapter of the Society for the Advancement of Management. He was cited for his daring to think, act, to live as a free, responsible individual. Mr. Daniel's firm, which employs some 10,000 persons, is currently engaged in work on 62 major projects involving investment of approximately \$400 million in eight Southern states.

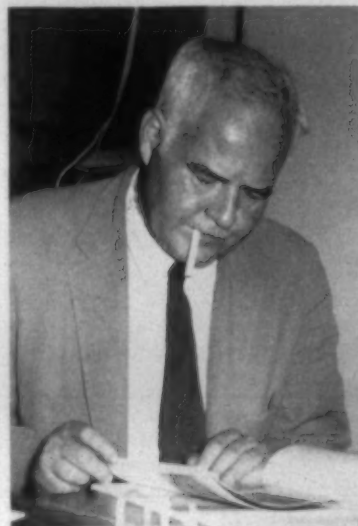
James M. Faria and Loyd M. O'Guin Jr. have joined the Chemstrand Corp., Decatur, Ala., as senior technical sales service representatives. Since his graduation in 1952 from New Bedford (Mass.) Institute of Technology where he earned a degree in textile engineering, Mr. Faria has served as a re-

search engineer with the Du Pont Co. His new duties will involve assisting customers in their use of Acrilan acrylic fiber and Chemstrand nylon. Mr. O'Guin served as a dyer and foreman with the Franklin Process Co., Chattanooga, Tenn., before joining the Chemstrand organization. He received a B. S. degree from Georgia Tech in 1951.

Eldon Stowell has been appointed manager of the yarn processing machinery division of The Fletcher Works Inc., Philadelphia, Pa. Mr. Stowell was formerly with Universal Winding Co. where he served as textile engineer in charge of yarn development. Prior to his service with Universal he was president of the Dunellen Corp., manufacturer of specialty yarns.

Parker Brown, plant engineer, Anchor Rome Mills, Rome, Ga., a subsidiary of Dan River Mills, Danville, Va., has retired after 31 years of continuous service to the company and its predecessors. Mr. Brown was first employed by the old Anchor Duck Mills in 1906.

Dr. William J. Roberts has been appointed director of research of the Celanese Corp. of America research laboratories, Summit, N. J. He had been director of research for Pennsylvania Industrial Chemical Corp., Chester, Pa., an organization with which he had been associated for almost 12 years. He holds a Ph.D. degree in organic chemistry from the University of Pennsylvania.



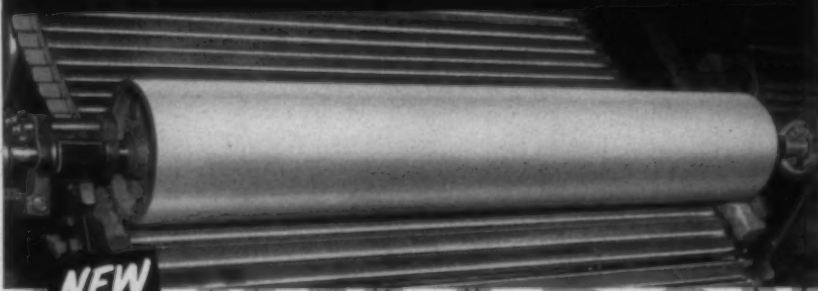
HENRY LESENE, a frequent contributor to TEXTILE BULLETIN, has been named to receive the 1957 Distinguished Service Award for Journalism. The award will be presented by the Southern Association of Science and Industry, a non-profit, non-political organization founded in 1941 for the study and development of the resources of the South. Mr. Lesesne, who at one time was associated with the Textile Information Service in its public relations program, has been active in journalism the past 30 years. At one time he was Southern bureau manager of International News Service in Atlanta, and subsequently was on the staff of the Associated Press in Charlotte. He later served as early day editor of A.P.'s Atlanta bureau. He has a son, Henry Jr., 15, and a daughter, Elizabeth Daniel Lesesne.

James D. Whatley has been elected vice-president of Indian Head Mills Inc. He has been placed in charge of cotton purchasing for the company and its subsidiaries, Indian Head Puerto Rico Inc. and Glendale Mills Inc. In addition to his responsibilities for cotton purchase and use, Mr. Whatley will, in a staff capacity, consult with merchandising personnel on the co-ordination of sales and production planning of greige fabrics. He will make his headquarters at Cordova, Ala. Mr. Whatley has been associated with the Cordova mill for 45 years, having started in 1912 as a sweeper and worked up through the mill. He was appointed superintendent in 1936 and plant manager and cotton buyer in 1953.

F. R. Piper has retired as an assistant manager of Fairfax (Ala.) Mill Division, West Point (Ga.) Mfg. Co., after 42 years of service with the company.

George S. Buck Jr. has been assigned to the newly established research post of technical research assistant to the executive vice-president of the National Cotton Council and will make his headquarters in Memphis, Tenn. Establishment of this post is expected to put the council in a stronger position for expanding cotton's over-all research effort. The objective is to provide technical research assistance to the council's

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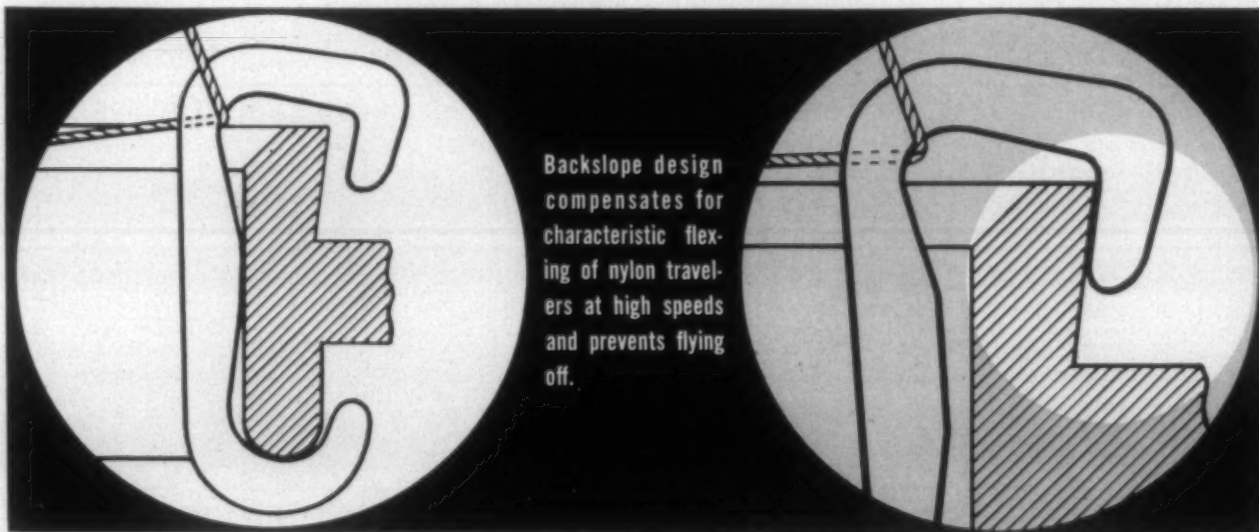
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PERSONAL NEWS

management. Prior to joining the council's utilization research staff in 1946, Mr. Buck was superintendent of the finishing plant of Wm. E. Hooper & Sons Co., Baltimore, Md., a cotton manufacturing and finishing firm. He has been concerned primarily with research aimed at improving the quality of cotton textile products and increasing cotton manufacturing efficiency. Mr. Buck holds a degree in chemical engineering from Johns Hopkins University.



H. Alison Webb

H. Alison Webb, manager of the Chattanooga, Tenn., branch and sales office of General Aniline & Film Corp., has been named assistant manager for dyestuffs and pigments by the company. Mr. Webb joined General Aniline as a member of the sales office staff at the Charlotte, N. C., branch shortly after his graduation from Clemson College in 1935 with a B. S. degree in textile chemistry and dyeing. He assumed the position as branch manager in Chattanooga in 1954.

L. M. Calhoun has been appointed to the sales department staff of Johnson Motor Lines Inc., Charlotte, N. C. He has had broad experience in the textile sales field, having been connected with the industrial sales department of the textile division of the Celanese Corp. of America, Charlotte, since 1955. Prior to that employment he served as general manager of the fiber glass division of Bigelow-Sanford Carpet Co. Inc.; sales manager of the fiber glass industrial fabrics division of Deering Milliken

Co.; and was with the sales departments of the fiber glass divisions of United Merchants Industrial Corp. and the Owens-Corning Fiberglass Corp. A graduate of Clemson College, Mr. Calhoun was also at one time a textile engineer and draftsman with J. E. Sirrine & Co., Greenville, S. C.

Paul C. Beatty has been appointed resident manager, Halifax (Va.) Mills, a division of Pacific Mills, a member of Burlington Industries. He first came to the company 11 years ago as resident manager of the plant and held this position until 1953 when he was given special staff assignments by Pacific Mills.

Clyde C. Cobb, assistant general manager, Riegel Textile Corp., Trion, Ga., has been elected general chairman of the Textile Operating Executives of Georgia at the group's Fall meeting. Mr. Cobb succeeds McAllister Isaacs, Anderson Mills, Columbus, Ga. . . . Lloyd K. Williams, Peerless Cotton Mills, Thomaston, Ga., has been elected vice-chairman of the group. He succeeds Mr. Cobb, who held the vice-chairman's post last year.

W. G. Kilpatrick has been appointed overseer of the cloth room at the Milstead, Ga., plant of Callaway Mills Co., LaGrange, Ga. He was formerly a second hand in the cloth room. Mr. Kilpatrick has been with the company since 1938. . . . Jack Sloan has been appointed an assistant overseer of carding at the Unity plant of Callaway Mills. He is a 1951 textile engineering graduate from Clemson College and has been employed in various capacities by the company since that time.

John N. Gregg has been appointed a sales representative for American Viscose Corp., New York City. Representing the company's staple division, he will work out

of Charlotte, N. C., beginning in January. Mr. Gregg was graduated from North Carolina State College in 1955 with a B. S. degree in textiles.



A. E. Winslow

A. E. Winslow has become associated, in an advisory capacity, with the research and developments departments of James Hunter Inc., Greenville, S. C. A graduate of Gosham Engineering School, University of Chicago, Mr. Winslow has over 25 patents on textile machines, processes and other mechanical devices. His latest design achievement is the Hunter bobbin holder for spinning frame creels. Mr. Winslow has been associated in design, engineering and management capacities for over 30 years with some of the textile industry's leading suppliers.

Z. Guy Willis, general manager of the Rock Hill, S. C., plant of Highland Park Mfg. Co., Charlotte, N. C., has been named general chairman of the 1958 Rock Hill United Fund Campaign. Mr. Willis was the industrial division chairman of the 1957 Fund campaign.



Roy A. Cheney

Roy A. Cheney has been appointed a special consultant for the textile clothing and footwear division of The Quartermaster Research and Engineering Command, Natick, Mass. Mr. Cheney served as president of the Underwear Institute, with headquarters in New York City, from 1919 to April of this year. During the year 1950, he was president of the Quartermaster Association and remains as a member of the association's executive committee. Mr. Cheney graduated from Yale in 1910 with an L.L.B. degree.

W. L. Dallas, formerly superintendent of the Southside Plant, Abney Mills, Anderson, S. C., has been named superintendent of weaving at Borden Mills Inc., Kingsport, Tenn. Mr. Dallas succeeds I. J. McClellan, who has become associated with J. P. Stevens & Co. Inc., Roanoke Rapids, N. C.

Frederick A. Gilbert has been named president of the Westvaco Chlor-Alkali Division, Food Machinery & Chemical Corp., New York City. He will continue as president of the company's Becco Chemical Division. A graduate of Harvard University, Mr. Gilbert became associated with Becco in 1935. He was named president of the division in 1956.

Dr. William H. Bowman and Neil B. Conley have been appointed general manager and assistant general manager, respectively, of the organic chemicals division, American Cyanamid Co., New York City. Dr. Bowman, formerly assistant general manager of the division, joined the company

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in 1955 following a ten year association with Jefferson Chemical Co. During the latter years of this previous association, he served as vice-president for sales and operations. Dr. Bowman is a graduate of New York University and received his doctorate from the University of Toronto. . . . Mr. Conley, formerly director of sales and manager of commercial operations for the division, has been with the company since 1940. Prior to that time, he was manager of the Ultramarine Co., of New York.



Walter Newcomb

sales manager of Burlington Engineering Co.

Miss Irene Blunt, executive secretary of the National Federation of Textiles, has been honored for her 40 years of service to the organization at a testimonial dinner at the Trianon Room of the Hotel Ambassador, New York City. Miss Blunt started with the old Silk Association, later to become the N.F.T., in 1917 as a statistical clerk and switchboard operator. She became assistant secretary in 1925 and secretary in 1933.



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merly manager of the fiber market development department of American Cyanamid Co. where he headed the Creslan acrylic fiber project. Prior to that he was technical director of the firm's fiber division. In the past, Mr. Bendigo has been associated with Judson Mills, Greenville, S. C., and Burlington Mills Corp., Greensboro, N. C.

## OBITUARIES

**David P. Dellinger**, 80, vice-president and director of Rhyne-Houser Mfg. Co., Cherryville, N. C., died in October. A public figure for half a century, Mr. Dellinger served in the State Legislature and two terms as mayor of Cherryville. He is

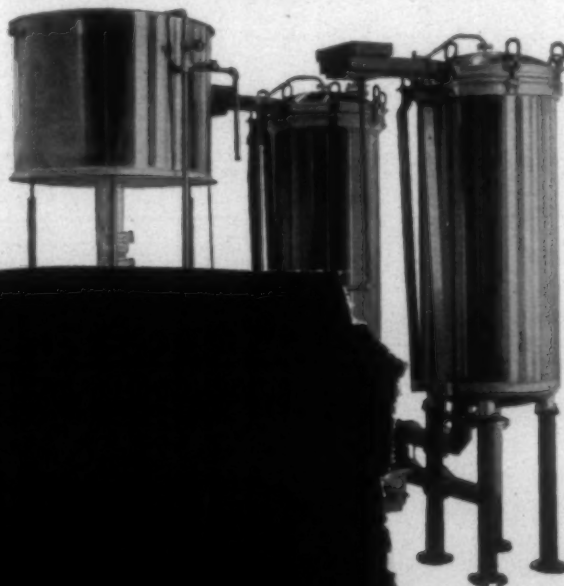
survived by his widow, a daughter, a sister and four brothers.

**William A. Erwin III**, 30, grandson of W. A. Erwin, founder of Erwin Cotton Mills, Durham, N. C., and a member of the firm, died after a brief illness in Miami, Fla., last month. Mr. Erwin is survived by his widow, three daughters and his mother.

**Thomas Joseph Ligon**, 92, retired head of the cotton department at Woodside Mills, Greenville, S. C., died last month. He is survived by one son.

**Luther Neal Reynolds**, 74, retired assistant superintendent of the bedspread mill Fieldcrest Mills, Leaksville, N. C., died

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frames are being supplied with the Super-Draft system. The company is also installing 80 deliveries of Model M drawing, ten Hi-Pro 12x6½-inch long-draft roving frames and 139 18x42-inch card coilers. . . . The American Thread Co., Tallapoosa, Ga., has installed 37 Whitin Superflex spinning frames with 3½-inch gauge, two-inch ring and eight-inch traverse. Twenty-four of the frames have 300 spindles each and 13 have 276 spindles each with a total of 10,788 spindles. . . . D. E. Rhyne Mills Inc., Lincolnton, N. C., is applying Whitin Long-Draft to nine roving frames involving 712 spindles. . . . Avondale Mills has purchased 48 deliveries of Model M Even-Draft drawing frames and two Super J combers from Whitin for installation at its Birmingham, Ala., plant. . . . Stowe Spinning Co., Belmont, N. C., has ordered six Long-Draft 10x5-inch roving frames with 120 spindles each. Forty spinning frames are being converted to Whitin Super-Draft. The total spinning spindles involved

is 10,880. . . . National Yarn Mills Inc., Belmont, N. C., has ordered seven Long-Draft roving frames with 120 spindles each and a 10x5-inch package. . . . Trio Mfg. Co., Forsyth, Ga., has installed two Whitin 12x6½-inch Long-Draft roving frames. . . . Rocky Mount (N. C.) Mills is installing eight Hi-Pro 12x6½-inch Long-Draft roving frames purchased from Whitin. . . . Palmetto Worsted Mills, Laurens, S. C., is converting six worsted spinning frames with 200 spindles each to the Whitin system of long-draft.

ROME, GA. — It is planned that the Anchor-Rome Mills will be officially designated the Rome Plant of Dan River Mills' Alabama Division. The new title for the plant which was acquired by Dan River Mills about a year ago will become official when the corporate structure of Anchor-Rome is dissolved. The change is said to be purely technical and represents no change in management or operations. The products

of the plant will continue to be sold by Iselin-Jefferson Co. Inc. as in the past. The plant will operate at a higher level of activity with some looms being increased to a six-day week.

GREENVILLE, S. C.—Woodside Mills has reduced its running time from a six to a five-day, three-shift operation in its Greenville and Fountain Inn units. The plant here is one of the large producers of 39-inch, 80x80, 4.00 yard print cloth. The move is being made in spite of a strong unfilled order position on print cloths. A company spokesman said that the firm did not wish to accumulate inventory on 80x80 fabric.

LEXINGTON, N. C.—Two queens were crowned as a feature of the annual Erlanger Day which was held here in September, attended by some 2,400 persons and sponsored by Erlanger Mills. Also part of the function were speeches by company officials and a barbecue luncheon.

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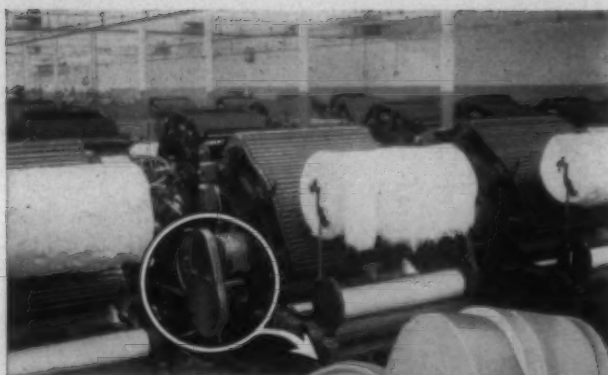
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## Holds Better Depreciation Rates Needed

Marion W. Heiss, vice-president of Cone Mills Corp., Greensboro, N. C., declared that a realistic depreciation rate for textile machinery "would help support a program for a revitalized textile industry," in addressing the Piedmont Chapter of the National Association of Accountants Sept. 20. "Reliable data prepared by the textile machinery manufacturers show that the textile industry has been using equipment generally at the rate of 6,000 hours a year, whereas 2,000 hours a year was the approximate average when the present table of depreciation rates was established in 1937," he said.

"The textile and probably other industries have suffered severe losses replacing obsolete machinery with new equipment in recent years because of inflation—which everybody from the president on down agrees is the nation's number one problem. Tragically, for our industry, textile prices have been sensational exceptions and have really been deflated. The inadequate depreciation rates of the past will become increasingly inadequate in the future unless an adjustment is made," Mr. Heiss said.

He told the meeting that the textile industry, through the American Cotton Manufacturers Institute, is requesting that the Internal Revenue Service recommend to the Congress a 15-year write-off period instead of the present 25-year period. "If the industry's plea for a realistic depreciation schedule is granted," he stated, "it will help the industry to re-equip with modern machinery and that will be a concrete step in attempting to meet global competition. An increased fiber consumption and a higher level of employment could be a definite result. In other words, it would help support a program for a revitalized textile industry."

Mr. Heiss added that the textile industry is coming to realize now that cost accounting is the pulse of the manufacturing operation. Modern business practices, he added, are absolutely essential nowadays in the textile industry "if we are to survive."

## Scholarships Awarded At Clemson

An 18-year-old Pendleton, S. C., student who worked a full eight-hour textile shift as a high school senior has been awarded a LaFrance scholarship at Clemson College. Kenneth Ray Buchanan has enrolled as a freshman in textile engineering on a four-year, all-expense-paid scholarship from the LaFrance Industries Foundation. Mr. Buchanan worked as a creeler in the beaming department of the LaFrance plant in his hometown. He was an outstanding student, maintaining an A-plus average through LaFrance Grammar School and Pendleton High School.

William Butler Green, St. Stephen, S. C., has been presented the \$2,000 employee scholarship of the Albany Felt Co. He began study this month in the School of Textiles at Clemson College. Butler had been employed since October 1956 as a weaver at the St. Stephen Albany plant. The award provides \$500 per academic year.

## I.T.T. Registers Seven For Graduate Work

Seven new students have registered for graduate study at the Fall session of the Institute of Textile Technology, Charlottesville, Va. Owned and operated by textile mills, the I.T.T. organized its graduate school in 1947 to provide the textile industry with personnel well founded in funda-

mental sciences and in textile technology. Fellowships are awarded each year to outstanding undergraduates in these fields so that they may pursue a two-year program of study leading to the master of science degree with a major in textile technology. I.T.T. also conducts a continuing program of textile research, both on a collective basis with its member mills and also for its individual member mills.

### A.A.T.C.C. Scholarships Awarded

The trustees of the Charles H. Stone Scholarship Fund of the Piedmont Section of the American Association of Textile Chemists and Colorists have announced the awarding of \$250 scholarships to Bobby Joel Bailey, Rutherfordton, N. C., a senior at North Carolina State College, majoring in textile chemistry and dyeing; and to James Cecil Hunter, Green Mountain, N. C., a junior at Clemson College, majoring in textile chemistry and dyeing. This is the third year these awards have been made. It is planned to continue these awards annually to a senior or junior majoring in textile chemistry and dyeing at the two schools.

### Texas Tech Offering Gin Course

Texas Technological College, Lubbock, will offer a new undergraduate course in cotton gin engineering beginning this Fall. The new course, together with courses in textile engineering and agronomy, will round out a specialized sequence according to college officials. Instruction in the ginning course will be given by a composite staff from the school's departments of agriculture and textile engineering and the U. S. Department of Agriculture Cotton Ginning Laboratory, Las Cruces, N. M.

### Export Policy Hit By A.T.M.A. President

The U. S. government's policy on exports and imports of cotton and cotton products has drawn strong criticism from F. M. Lyon, president of the Alabama Textile Manufacturers Association. "This one-world minded government of ours is selling our own cotton to our world competitors at one-fourth less than our own mills can purchase from our good farmers and at the same time opening our U. S. markets to those same mills to supply with lower priced cotton," Mr. Lyon said in a talk before the September meeting of the Exchange Club of Sylacauga, Ala.

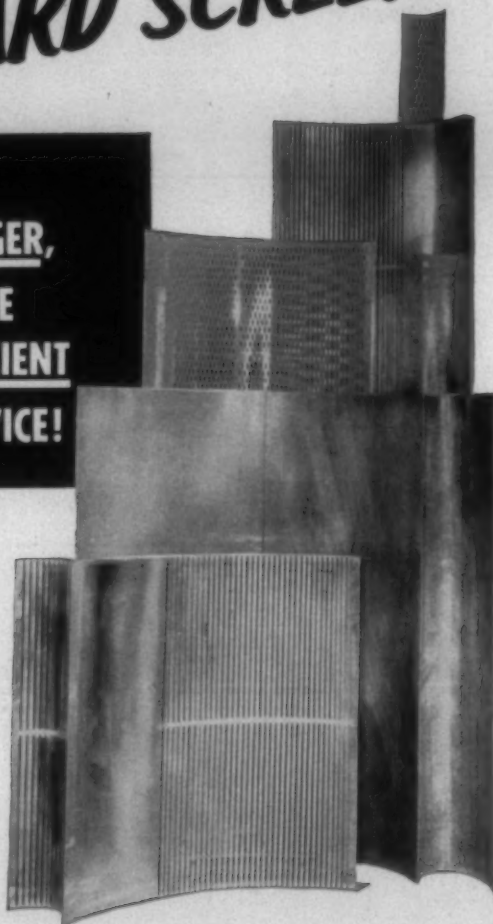
Mr. Lyon, president of Opp (Ala.) Cotton Mills and Micolos Cotton Mills, Opp, said "those countries, particularly Japan, pay a fraction of our wage rates and thus take over our carefully and costly developed markets. We need to regain our equitable share of the world markets." He added that American goods exports are several hundreds of million yards less than formerly shipped abroad. He called on the U. S. government to either help or stop interfering with the textile industry.

"We have poured millions of dollars into Japan to rebuild her textile industry, we have sent technicians and engineers to show her how to run her industry more economically; we meant good, but ill has come to us for Japan has exploited her cheap labor and with the help of our government has allowed cotton products to come into this country for every conceivable end use," Mr. Lyon declared. The attitude of the U. S. toward world trade was attacked by Mr. Lyon. He charged that "even in world trade as carried on by nations around the globe we have

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promoted international trade on a basis approaching free trade. We are as a baby sucking a lollipop in our apparent ignorance and complacency." Declaring that the textile industry cannot blame all its troubles on the government, Mr. Lyon called on industry officials to assume greater roles of leadership and responsibility. He said that some mills have been resorting to price cuts at the expense of profits necessary to assure a sound operation.

### Georgia Group Seeks More Textile Students

An enrollment committee of the Textile Education Foundation Inc. has started an intensive campaign in Georgia to enroll more of the freshmen who will be entering colleges in 1958 into the A. French Textile School at Georgia Tech. Chairman of the committee is John P. Baum, vice-president, J. P. Stevens & Co., Milledgeville, Ga. Mr. Baum will have the assistance of B. W. Whorton, president, Dixie Mills Inc., LaGrange, Ga., president of the foundation, and M. Earl Heard, vice-president of research, West Point (Ga.) Mfg. Co.

The 1958 enrollment campaign will recommend that Georgia's textile mills and companies start immediately a vigorous campaign in their communities to make high school students more aware of opportunities in the textile industry. The committee pointed out that failure to relieve the current shortage of trained personnel would be dangerous to the future of the textile industry.

The program will consist of publicity and direct contacts with student groups, teachers and parents. Specific activities which the committee suggests include plant tours; classroom talks and demonstrations; interviews; the accumulation and dissemination of appropriate factual information on a local basis, newspapers, radio and TV publicity; and the establishment of direct relations with school officials. Selected groups of students will be allowed to visit the Georgia Tech campus at the invitation of subdivisions of the committee or local textile companies. It was emphasized, however, that personal contact with high school students will be the most important influence in the campaign.

### Sees U. S. Textile Use Nine Billion Pounds

National consumption of textiles at the rate of nine billion pounds per year by 1975 was forecast by B. L. Whittier, head of the department of fabric development, School of Textiles, North Carolina State College, in an address before the Charlotte (N. C.) Engineers Club Sept. 23. The forecast was based on an estimated population of 200 million and a consumption rate of 45 pounds per person by that year. He said if the national economy is maintained near its present level, "there can be no way except up for the textile industry."

Professor Whittier said that the present textile consumption of six billion pounds per year is achieved with a population of 170 million persons each consuming textiles at the rate of 35 pounds per year. He pointed out that this production comes from 500,000 looms which is the same number that produced the nation's gross consumption of 2.5 billion pounds in 1920. Mills have been operating at better than 90 per cent capacity based on a 120 hour week. He said that unfortunately when demand has equalled 100 per cent of capacity many mills have gone into six and seven day operations which has resulted in over-pro-

duction and consequent lowering of prices and all that goes with it.

"At the present time, only eight cents of each dollar available for purchase by the American people is spent on textiles. The industry is aware of the possibility of increasing this. Even a one cent increase would push the demand beyond the present capacity to produce," he said. Professor Whittier pointed out that the textile industry has been notorious for quick response to a change in the balance of supply and demand and, "as long as the bulk of production comes from many small and medium sized mills, it probably will always have this quick response." He concluded saying that "unless something is wrong with the figures, I believe that the textile industry will be as prosperous for the next 20 years as it was when I was a boy in Lowell, Mass. I think the liquidation period is about over."

#### A.T.M.A. Convention Slated For April 16-18

The 1958 annual meeting of the Alabama Textile Manufacturers Association will be held at Biloxi, Miss., April 16-18, according to Dwight M. Wilhelm, association executive vice-president. E. R. Lehmann, chairman of the association's annual meeting committee and vice-president of the West Point (Ga.) Mfg. Co., said the meeting again will be held at the Buena Vista Hotel. As usual, Mr. Lehmann said, the meeting will include several business sessions at which industry-wide problems will be discussed.

Members of the annual meeting committee, in addition

to Mr. Wilhelm and Mr. Lehmann, are Mrs. Lehmann and Mrs. Wilhelm; Mr. and Mrs. F. M. Lyon, Opp; Mr. and Mrs. R. C. Moyer, Blue Mountain; Mr. and Mrs. Joel E. Johnson, Geneva; Mr. and Mrs. T. H. Floyd, Opelika; Mr. and Mrs. Wilson Patterson, Tallassee; Mrs. Sara Davenport and Mrs. Mary Hester, Montgomery, Ala.; Mr. and Mrs. Herman Jones, Atlanta, Ga.; Mr. and Mrs. Hugh K. Smith, West Point, Ga., and Mr. and Mrs. Haley Ector, Atlanta, Ga.

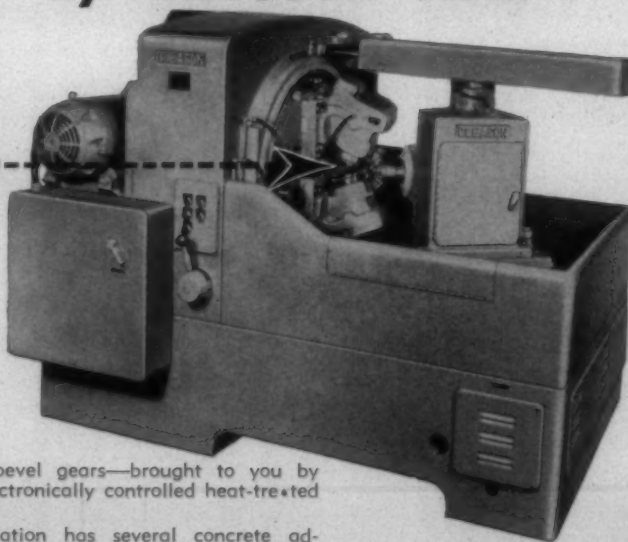
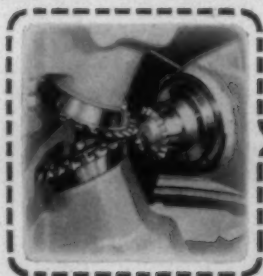
#### Burlington Student Loans Reach Half Million

Educational loans to sons and daughters of Burlington Industries employees, and to employees, have totaled approximately \$500,000 since the textile organization set up its Education Loan Fund in 1946. The Loan Fund is one phase of the Greensboro, N. C., company's extensive aid to education program. The program of financial assistance to deserving high school graduates and college students was established in memory of the late James Lee Love, distinguished educator who taught at Harvard University and father of J. Spencer Love, Burlington's chairman and president.

Through the beginning of the current school year, nearly 1,300 loans have been made under the program. Loans to 180 students attending 72 different universities and colleges have already been approved for the 1957-58 school year. The colleges and universities being attended by these students include 33 institutions in North Carolina, ten in Virginia, seven in South Carolina, four in Georgia,

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eight in Tennessee, two in Florida, two in New Jersey, two in New York, and one each in Alabama, California, Massachusetts and Mississippi.

The educational loan program is administered by the Burlington Industries Foundation. To assist the foundation in administration of the fund and selection of students to be aided, local committees have been organized in communities where Burlington plants are located. These committees are usually composed of plant superintendents and personnel supervisors, school principals, ministers, bankers and other community representatives.

Other phases of the aid to education program include scholarship awards established at 15 colleges and universities, with equal financial grants to the schools where the scholarships are used; matching of the tuition portion of educational loans with equal grants to colleges attended by educational loan recipients; and matching dollar for dollar gifts up to \$2,500 per year made by Burlington employees to colleges and universities they attended.

### A.A.T.C.C. Convention Slated For Nov. 14-16

The annual convention of the American Association of Textile Chemists & Colorists will be held at the Hotel Statler, Boston, Mass., on Nov. 14, 15 and 16. In addition to the scientific papers, highlights of the meeting will be the presentation of the Olney Medal; tours of Greater Boston industrial installations, and university and military research facilities; honor awards to A.A.T.C.C. charter members; a "State of the Association" message by President George O. Linberg; and evening activities in the ballroom including a pops concert by the Harvard University Band and Glee Club.

Ernest R. Kaswell, Fabric Research Laboratories, convention chairman and vice-president of the association, reports that every effort is being made to continue Boston's reputation for outstanding conventions both in scientific stature and convention conviviality. Registration will be held Thursday, Nov. 14, with technical sessions planned for both the morning and afternoon. Also on Thursday afternoon, Lowell Technological Institute will hold an open house including the A.A.T.C.C. research and administrative headquarters. L.T.I. President Martin J. Lydon has announced that visitors will be able to see the school in action and to observe carding, spinning, weaving, dyeing and fabric-finishing operations.

The association's national council will hold a dinner and meeting Thursday evening. Arrangements are being made for a limited number of visitors to enjoy dinner with the council. Following a Friday morning technical session, the Olney Luncheon will be held Friday noon with the Olney Medalist, P. J. Wood, as guest of honor. It is anticipated that many of his friends and associates will gather to honor him.

The intersectional prize paper contest will be held Friday afternoon with five sections of the association already having signified their participation intention. Tours to various university, industrial and military research and development laboratories are being arranged also for Friday afternoon. Included will be the Quartermaster Research and Development Laboratories, Fabric Research Laboratories Inc., Tracerlab and the textile division of Massachusetts Institute of Technology.

Friday evening the Harvard University Band and Glee

Club will present a Pops program in the grand ballroom of the Statler. Tables will be arranged to enable the audience to enjoy refreshments and drinks. The pops concert was a high spot of the 1952 convention in Boston and it is anticipated that it will be equally enjoyed this year. Information on Saturday's technical sessions will be released at a later date. No special luncheon activity is planned for Saturday noon.

The annual banquet will be held on Saturday evening. Because the A.A.T.C.C. was created in Boston and the ranks of charter members are thinning rapidly, special recognition and honor will be given to some 70 charter members who participated in the founding of the association in 1921. Charter members who can attend will be awarded properly inscribed certificates, acknowledging their charter membership.

Dr. Harold C. Chapin, retired secretary, and Albert E. Sampson, retired treasurer, recently unanimously elected honorary members of the association, will be honored with acknowledging certificates. All past presidents of the association, in recognition of their contributions, will also be given duly inscribed certificates. Pertinent to honoring the charter members, it is planned to have a speaker briefly review the activities of the association since its inception. This will be followed by a "State of the Association" talk by George O. Linberg, association president, who will review recent accomplishments and tell future plans of the association.

### Urges 'Live And Let Live' Textile Policy

Kojiro Abe, chairman of the All-Japan Cotton Spinners Association, told delegates of the International Cotton Conference meeting Sept. 22-28 in Venice, Italy, that a "live and let live" policy is necessary among the cotton industries of the world. The conference was sponsored by the International Federation of Cotton and Allied Textile Industries. Theme of the meeting was "The Cotton and Allied Textile Industries in a World Economy."

Mr. Abe defined the goals of the Japanese cotton industry as supplying more clothes to Japan's 90,000,000 people and contributing to greater consumption of cotton by overseas consumers. "These aspirations, I believe, are realizable on the basis of mutual understanding and live and let live relations among the cotton industries of the world," Mr. Abe declared. "We aspire to it not only because we, as textile manufacturers, are eager to serve the cause of uplifting the welfare of consumers in wide areas of the world but also because we want to fulfill the role our industry has to assume under present economic conditions of the country by earning gold which is constantly short in Japan."

Noting that Japan must import most basic raw materials, Mr. Abe declared that Japan's rapid industrial expansion has brought an upsurge in the import of raw materials without a correspondingly strong increase in exports. Coupled with brisk capital investments at home, the unfavorable import-export balance has placed a heavy drain on reserves, Mr. Abe said.

Because of this, the Japanese government early this year initiated a tight money policy and direct import controls, which have had noticeable impact on the cotton industry, Mr. Abe reported. He disclosed that for the first half of the current year the raw cotton import budget was drastically reduced. Mr. Abe noted too that the Japanese govern-



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ment introduced several restrictive measures to adjust the further expansion of productive equipment. He attributed these steps to fears that strong investments in the textile industry would lead to over-production and would hamper the smooth development of foreign export markets.

Consideration for American textile interests has led the Japanese cotton industry to make voluntary export adjustments, Mr. Abe said. He reported that early this year, for example, a five-year program of voluntary adjustments was introduced which set definite limits on the export of cotton goods to the United States. However, the program, which is to be reviewed annually, has already had a serious effect on certain branches of the textile industry. According to Mr. Abe, it has resulted in several textile production cut-backs in Japan.

Mr. Abe reiterated the continual importance of the self-restraint program "in order to effect orderly marketing of Japanese cotton textiles in the United States." Despite the problems which have grown out of Japan's industrial transformation and the failure of cotton exports to keep pace with imports, Mr. Abe noted that the textile industry is still the most important of Japan's manufacturing industries. He revealed that the cotton industry alone, measured by the consumption of raw cotton, expanded at the rate of 35 per cent between 1952 and 1956. Statistics indicate that world cotton consumption increased by 14 per cent during the same period. Other speakers who addressed the conference include representatives from England, Germany, Sweden, India, Austria, France, Italy, the Netherlands and the U. S.

#### A.I.E.E. Textile Section To Meet Nov. 14-15

A conference on "Electrical Equipment for the Textile Industry" will be held Nov. 14-15 at the Riddick Laboratories auditorium, School of Engineering, North Carolina State College, Raleigh. The conference is jointly sponsored by the textile sub-committee and the North Carolina Section of the American Institute of Electrical Engineers, and the department of electrical engineering and School of Textiles.

Registration for the conference will begin Thursday morning, Nov. 14, and will be followed by tours of the Schools of Textiles and Engineering. Howard E. Strock, E. H. Gilliam Co., Charlotte, N. C., will preside at the afternoon session which will feature an address of welcome by Dean Malcolm E. Campbell, School of Textiles and the delivery of papers by E. R. Burgin, I-T-E Circuit Breaker Co., Philadelphia, Pa., and C. L. Griffin, General Electric Co., Schenectady, N. Y. Mr. Burgin will speak on "The Co-Ordination Of Circuit Breakers And Fuses In Textile Mills." The title of Mr. Griffin's paper is "Starting And Maintenance Of Range Drives." Other papers to be delivered at the afternoon session include "Clutch-Brake Motor Application To Textile Machinery," E. P. Turner, Diehl Mfg. Co., Somerville, N. J.; and "Du Pont's Approach To Materials Handling," C. B. Putney, engineering service division, The Du Pont Co., Wilmington, Del.

The Friday morning session will include a report from the standards committee and papers by G. B. Hoadley, head, department of electrical engineering, N. C. State; M. R. Brice, manager, service sales division, Cutler Hammer Inc., Milwaukee, Wis.; and Morris V. Gelders, Lockwood-Greene Engineers, Spartanburg, S. C. Mr. Hoadley's paper is entitled "Fundamentals Of D. C. Circuits And D. C.

Motors." Mr. Brice will speak on "Basic Motor Control." Mr. Gelder's topic is "An Ideal Electrical Layout For A Textile Mill."

The conference will close Friday afternoon with a textile forum which is to be preceded by two papers. George V. Fowler, Henderson (N. C.) Cotton Mills will speak on "Modernization Of Electrical Applications In Cotton Mills." "What's New In Textile Machinery" will be the subject of Milton C. May, associate editor of *Textile Industries* and *Southern Power And Industry*, Charlotte, N. C. Extra copies of the proceedings of the conference may be purchased for \$1.00. Copies of last year's proceedings are available at the same price.

### U.S.D.A.-Clemson Contract For Resin Research

A new research program to study the effects of various synthetic-resin and rubber-latex emulsions upon cotton has been announced by the U. S. Department of Agriculture. A contract for this research has been negotiated between the department's Agricultural Research Service and the Clemson School of Textiles, where the work will be done.

The contract was negotiated for the department through its Southern Utilization Research and Development Division, New Orleans, La., as part of a continuing program to develop new uses for cotton and to make cotton fabrics more suitable for present uses. Many resinous and rubber-latex compounds are now commercially available. Although some of them are already being used to treat cotton, their full possibilities have not yet been explored. In the Clemson

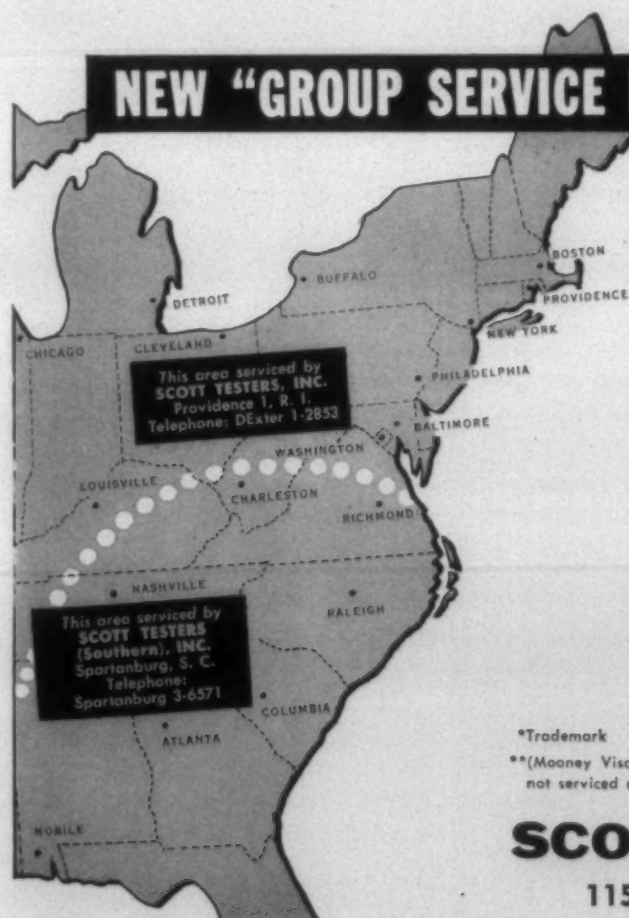
study, selected compounds will be used to learn if they will impart desirable new qualities to cotton.

Preliminary analysis shows that some of these compounds can improve cotton's resistance to water, abrasion, weathering and soiling. Tenting, tarpaulins and rainwear and other cotton clothing may benefit from such improvement. James H. Langston, professor of textile chemistry and dyeing at Clemson, and Carl Hamalainen of the cotton chemical section at U.S.D.A.'s New Orleans laboratory will direct the research.

### Details Of Opener-Cleaner Available

A new machine for cotton textile mills, combining superior bale-opening and blending abilities with outstanding efficiency in cotton cleaning, has been developed by cotton utilization specialists of the U. S. Department of Agriculture. The machine was designed by Ralph A. Rusca and Ray C. Young at U.S.D.A.'s Southern Utilization Research and Development Division, New Orleans, La. It retains all the advantages of the earlier S.R.R.L. cotton opener, invented by Messrs. Rusca and Young, which has had wide acceptance by the industry.

In addition, the new machine—known as the S.R.R.L. Opener-Cleaner—operates at high cleaning efficiency and with only half the lint loss of existing textile cleaning machines. Development of the new device comes at a time when greater efficiency and economy in the handling of trashy cotton is highly important to the cotton textile industry. The proportion of cotton hand-snapped or machine-



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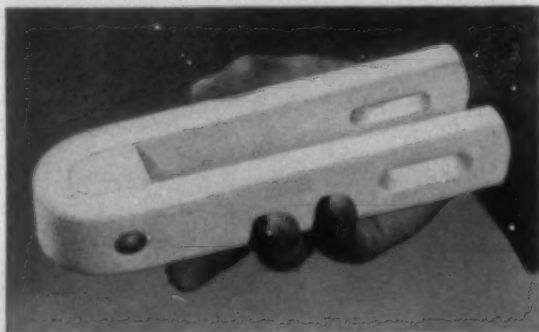
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harvested is increasing. Because this cotton contains large amounts of trash, the increased waste involved in its processing causes substantial reduction in returns throughout the industry, from growers all the way to textile manufacturers.

The principle of the S.R.R.L. Opener-Cleaner is covered by U. S. Patent No. 2,780,839, which is available for license from the Secretary of Agriculture on a royalty-free, non-exclusive basis. Copies of the patent may be obtained from the U. S. Patent Office at 25 cents each. Engineering drawings and technical specifications for the machine may be obtained by licensees without cost from the Southern Utilization Research and Development Division, P. O. Box 7307, New Orleans 19, La.

The high performance of the opener-cleaner is indicated by the fact that it has an average cleaning efficiency of 35 per cent and that the waste it removes contains about 86 per cent trash and only 14 per cent lint and short fibers. This performance is achieved at no increase in horsepower and only slightly more floor space than that required by the original S.R.R.L. Opener.

The S.R.R.L. Opener-Cleaner utilizes four opening-blending cylinders and two cleaning cylinders of the card-licker-in type. Each cleaning cylinder is equipped with two combing rolls and a series of conventional grid bars applied in an unconventional manner. Doffing the cotton is accomplished by revolving strip-type brushes, which cannot damage the teeth of the cleaning cylinders.

The machine can be constructed in sizes to process 750 to 2,500 pounds of cotton per hour. The 1,500-pound size is physically the same height and width as a standard 34-inch model S.R.R.L. Opener and is only 18 inches longer. While the new opener-cleaner affords a marked increase in the efficiency of cotton processing, the outlook is good for still further improvements, say U.S.D.A. researchers. Tests of a simple laboratory-size aerodynamic cleaning unit at the New Orleans laboratory indicate the possibility of increasing the cleaning efficiency of the machine from its present 35 per cent to 45 per cent by the addition of this feature. U.S.D.A. textile engineers estimate that another year will be required to evaluate this aerodynamic cleaning unit thoroughly and—if it proves successful—to incorporate it into the design of the opener-cleaner. When the aerodynamic cleaner becomes available it can be added to opener-cleaners already installed in mills.

## Synthetic Felts Gaining In Recognition

Synthetic fiber felts of Dacron polyester fiber, Orlon acrylic fiber, Teflon tetrafluoroethylene fiber, and nylon are relatively new but are gaining rapid recognition by industry for top performance in critical applications, according to industrial fiber development specialists of the Du Pont Co.

Newest of these versatile materials, non-woven synthetic fiber felts were created initially in Du Pont's research laboratories. They have only recently been brought to commercial production through the co-operation of leading textile manufacturers.

Commercial production of non-woven felts of Dacron and Orlon have been announced that are available in wide ranges of thicknesses, density and permeability to fit specific uses. The felts are produced in two types—completely non-woven and fabric-supported. In a 100 per cent non-woven felt, syn-

thetic staple fibers are carded to form a web. After the web is cross-lapped, giving a batt with depth and random fiber distribution, it is put through a needle loom where the fibers are mechanically interlaced and locked together. The needle batt is then subjected to heat or chemicals, or a combination of both, to achieve shrinkage.

In a fabric-supported felt, the cross-lapped batt is needle punched onto an open-weave base fabric. The supporting fabric serves to add dimensional stability to this type of structure, which may be heat-set or pre-shrunk if desired. The chemical-thermal properties of synthetic fiber felts are determined by the fiber used and the choice of the fiber depends upon the particular application.

The largest initial field for synthetic fiber felts has been filtration of gases and liquids—in chemical manufacture, food processing and air cleaning—but a variety of mechanical uses for these high performance felts is expected to develop, particularly in wicking, sealing, lubricating, cushioning and polishing materials.

Felts of Dacron polyester fiber and Orlon acrylic fiber have received their most intensive testing in Hersey-type dust collection equipment where they have demonstrated wear life many times that of conventional filter media and collection efficiency of more than 99 per cent. A typical example of top performance in Hersey-type, high draft-ratio, reverse-jet equipment is exhibited by non-woven felts of Dacron which have resistance to temperatures as high as 350 degrees F., tensile strength in the range of 1,600 to 2,000 pounds per square inch, dimensional stability in the presence of moisture, or temperatures in the range of 350 to 400 degrees F., and resistance to abrasion.

Abrasion resistance has made a major contribution to the success of this type of filtration in a taconite mining operation. Synthetic fiber felt bags of Dacron polyester fiber and Orlon acrylic fiber in two Hersey-type collecting units, clear the atmosphere of about 1,000 pounds of taconite dust every hour of operation. Taconite dust has a hardness almost equal to diamond dust but the synthetic bags have been virtually unaffected after almost two years of operation.

### Chemical Fibers To Gain In Importance

Production of chemical textile fibers should become one of the South's most important industries within the next ten years if current predictions prove accurate, Alabama textile manufacturers were told recently by Dr. Frank J. Soday, vice-president and director of research, Chemstrand Corp., Decatur, Ala. "The manufacture of chemical fibers is almost wholly a Southern industry," he said. "And the predicted increase in production from 500 million pounds in 1956 to four billion pounds in 1975 indicates it will become one of the most important operations in the area."

It will also mean a more profitable period for the natural fibers, Dr. Soday said, as fabric blends become more widely used. The cotton market was singled out as one area which will be enhanced by blends. Dr. Soday was the featured speaker at the 1957 public relations meeting of the Alabama Textile Manufacturers Association in Birmingham, Ala. He said both the raw materials for making chemical fibers and the textile mills for spinning the fiber into yarns and fabrics are largely located in the South. "While some concern has been felt in certain sections of the country as to the effect of chemical fibers upon established markets

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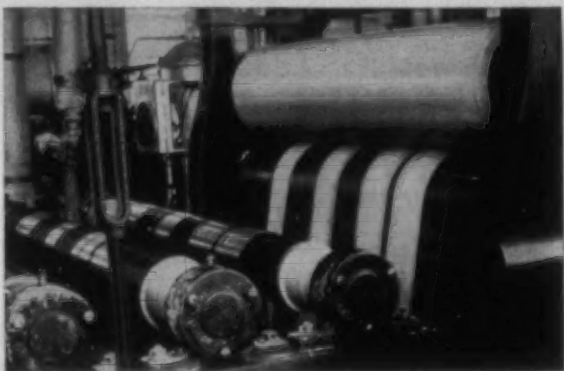
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for natural fibers, the South is in the happy position of being on the winning side regardless of the outcome of the competition between cotton, rayon and chemical fibers," Dr. Soday added.

### Second Quarter Weaving Production Off

According to the Bureau of the Census cotton broad woven fabric production in the second quarter of 1957 was three per cent below the previous quarter and seven per cent lower than the second quarter 1956 level. Production of all major fabric classes showed declines compared to the previous quarter ranging from one per cent for print cloth fabrics to 11 per cent for duck and allied fabrics and for napped fabrics. The decline compared to the second quarter of 1956 for the product classes ranged from three to 20 per cent.

Production of broad woven goods of man-made fibers and silk was 560 million linear yards during the second quarter of 1957. This was two per cent below the first quarter 1957 level and one per cent below the second quarter 1956 output. Rayon and acetate fabric production was three per cent below the previous quarter and 13 per cent less than the output during the comparable period of 1956. Production of other man-made fiber fabrics, including silk, was at approximately the same level as the previous quarter and 31 per cent above the second quarter 1956.

The data from the bureau included in the reports represented the entire production of man-made, silk and cotton broad woven fabrics over 12 inches in width. Estimates are included for all manufacturers whose reports were not received in time for tabulation. Such companies accounted for six per cent of the total man-made fiber production and three per cent of the total cotton production.

### Nylon Penetrates Tire Cord Market

According to the Du Pont Co.'s product information service, today's nylon-cord tires have reached an eminence that was just a gleam in research men's eyes 15 years ago. In 1956, all the nation's leading airlines were on nylon-cord tires. Virtually all off-the-road equipment was on nylon-cord tires. Approximately 30 to 35 per cent of the country's trucks and buses were rolling on nylon-cord tires. About 25 per cent of replacement automotive passenger car tires, including all premium tires, were reinforced with nylon cord.

An important factor in the outlook for nylon tire cord in 1957 is the fact that major tire manufacturers are marketing nylon-cord passenger car tires at prices approximately five per cent above those for rayon-cord tires of comparable construction. The steady increase in tire cord performance over the years, through a series of improvements in rayon cord and the introduction of nylon, has been made possible only through the constant efforts of research.

Tire cord performance is measured in terms of utility, durability, resistance to damage by impact, moisture, heat, flexing and of aesthetics including such factors as ride comfort and noise levels on the road. There are many methods for testing tire cords. These tests include: (1) bruise resistance tests which are performed to determine the number of impacts required to cause tire failure; (2) high speed performance tests which are run by placing the tire against a flywheel turning at a given speed, at a given temperature for a given length of time; (3) carcass energy tests which

measure the force required to puncture a tire; and (4) flexing tests which are used to determine the cord degradation per 10,000 miles of operation.

Further progress for nylon tire cord will come in areas in which its outstanding properties are desirable and important but which require consumer education. Nylon-cord tires are now backed by a narrowing price differential for the finished tire in comparison with rayon-cord tires.

### Synthetic Fiber Paper Developed

Successful development of a synthetic fiber paper has been announced at the October regional meeting of the Technical Association of the Pulp and Paper Industry, Cincinnati, Ohio. The new paper, result of a joint research venture by the Chemstrand Corp. and the Hurlbut Paper Co., will meet special needs of the pulp and paper industry, according to Dr. Hanns F. Arledter, Hurlbut research director.

The paper can be produced on conventional machinery using a new acrylic fiber developed by Chemstrand, Dr. Arledter said, and affords the manufacture of binder-free synthetic fiber papers. Dr. Arledter told the group that this major development in paper technology is of special interest to the laminating industry and for electrical uses, chemical filtration, chromatography and many others. The new paper is in the development stage and it is anticipated that production quantities will be available in a few months.

### Wool Consumption And Stocks

According to figures released by the Bureau of the Census the weekly average rate of fiber consumption on the woolen and worsted systems in August was 27 per cent above the July rate but 11 per cent below that of August 1956. The weekly average raw wool consumption during August was 7,276 thousand pounds (scoured basis) or 22 per cent above the July level, but 19 per cent below that of August 1956. Consumption of apparel class wool was 14 per cent above the July level but 19 per cent below that of August of last year.

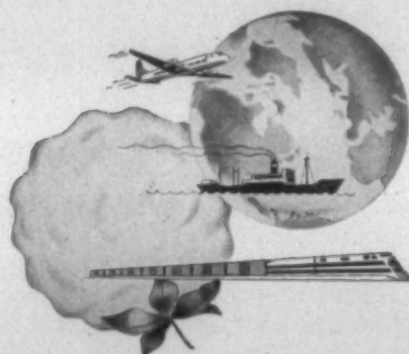
Consumption of carpet class wool was 44 per cent above the rate of the preceding month but 20 per cent below the August 1956 rate. Consumption of fibers other than raw wool averaged 6,298 thousand pounds per week or 33 per cent above the July average and two per cent above August 1956. No allowance has been made for seasonal changes in compiling these monthly totals and per cent changes.

### Shirts Reported Biggest User Of Cotton

More cotton was consumed in the manufacture of men's and boys' shirts last year than in any other end use, according to estimates reported in the 1956 preliminary edition of *Cotton Counts Its Customers*. The publication has just been released by the National Cotton Council's market re-

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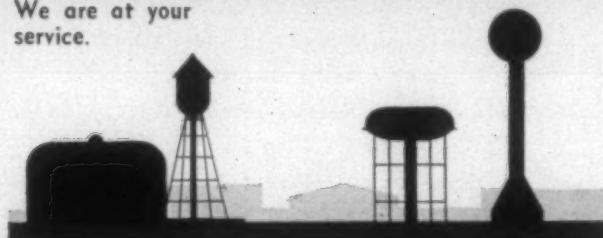
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search section. Shirts accounted for 595,000 bales while sheets consumed 569,000 bales and drapery and upholstery fabrics took 567,000 bales. Rounding out the top ten end uses of cotton in 1956 were men's and boys' trousers, towels, men's and boys' underwear, automobile uses, dresses, rugs and carpets and retail piece goods, in that order.

The summary of the publication reports that in the three main end uses of cotton 43.5 per cent of total cotton consumption for the year went into apparel. Production of household fabrics took 33.6 per cent and industrial uses consumed 22.9 per cent. Cotton usage increased significantly in women's nightgowns, pajamas and skirts. Other substantial increases were noted in children's blouses, shirts, dresses, and suits and skirts. Increased consumption was also reported in sheets, towels and machinery belts.

On the other hand, cotton consumption declined in rugs and carpets and in automobile uses. *Cotton Counts Its Customers* is published each year by the council and contains estimates of cotton consumption in 418 end uses which account for about 90 per cent of domestic mill consumption. Copies of the report are available on request from the National Cotton Council, P. O. Box 9905, Memphis 12, Tenn.

### Cotton Consumption For 1957 Lower Than 1956

Total consumption of cotton for the 12 months through July 1957 amounted to 8,736,170 running bales which is lower than the 9,141,012 running bales used during the 12 months before July 1956, according to reports from the Bureau of the Census. The total running bales used during August 1957 was 666,549 as compared with 637,345 during July 1957 and 686,428 during August 1956. The cotton-growing states consumed 636,786 bales during August 1957 compared to the 25,870 bales used in New England during the same period.

Daily average consumption in the U. S. during August 1957 amounted to 33,327 bales which is a big increase over July 1957 which saw 25,494 bales used. Daily average consumption in the U. S. during August 1956 was 31,321. Cotton consumption adjusted for seasonal variations (1947-1949=100) were calculated to be 96 for August 1957, 93 for July 1957 and 99 for August 1956.

Total cotton being held in stock during August 1957 amounted to 10,319,886 bales. Of this figure, consuming establishments held 993,041 bales and 9,326,845 bales were in public storage. These figures are considerably below the total stocks held in August 1956 when of 13,215,559 total bales, consuming establishments held 798,103 bales and public storage places held 12,417,456 bales.

During August 1957, 19,704 thousand spindles were active of the 21,192 thousand total in place. The active spindles were operated 9,123 million spindle hours during the period. August 1956 had 21,712 thousand spindles in place and 20,468 thousand of them were active. The active spindles during this period last year were operated a total of 9,545 million spindle hours.

North Carolina was ahead of South Carolina in daily average consumption during August 1957 with 9,932 running bales as against 9,493. This reverses the July 1957 totals which saw South Carolina use 7,598 as against North Carolina's 7,189 bales. South Carolina was also ahead of North Carolina during August 1956 having a daily consumption of 9,969 bales compared with 9,760 bales.

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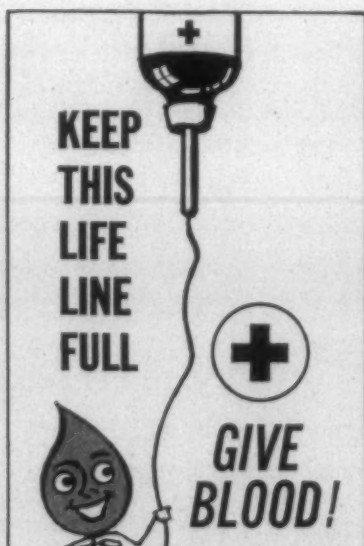
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• If you want a new job, if you are seeking someone to fill a position, the classified advertising department of Textile Bulletin is ready to help. The classified section is read by both employees and employers.

• Firms having textile mill equipment for sale also find Textile Bulletin classified advertisements valuable in establishing business contacts.

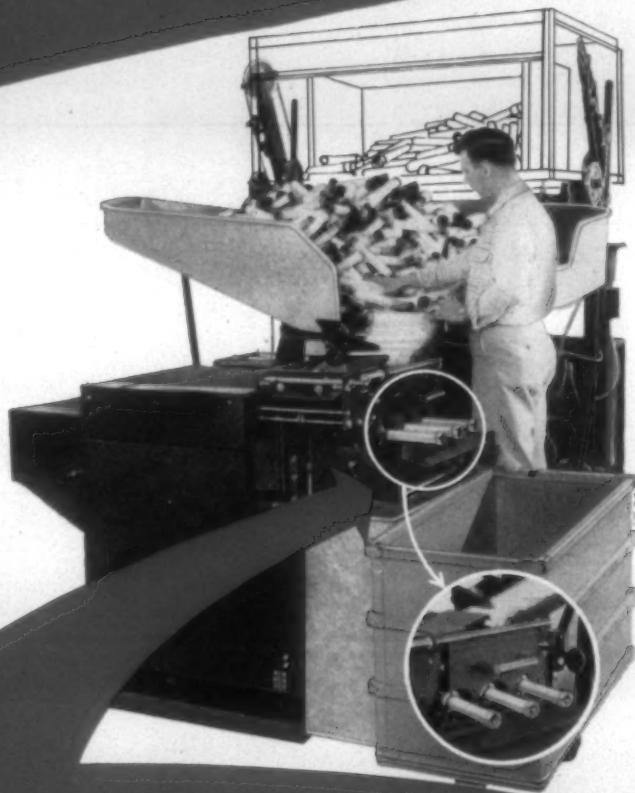
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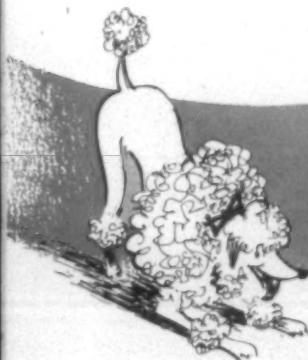
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***Terrell***

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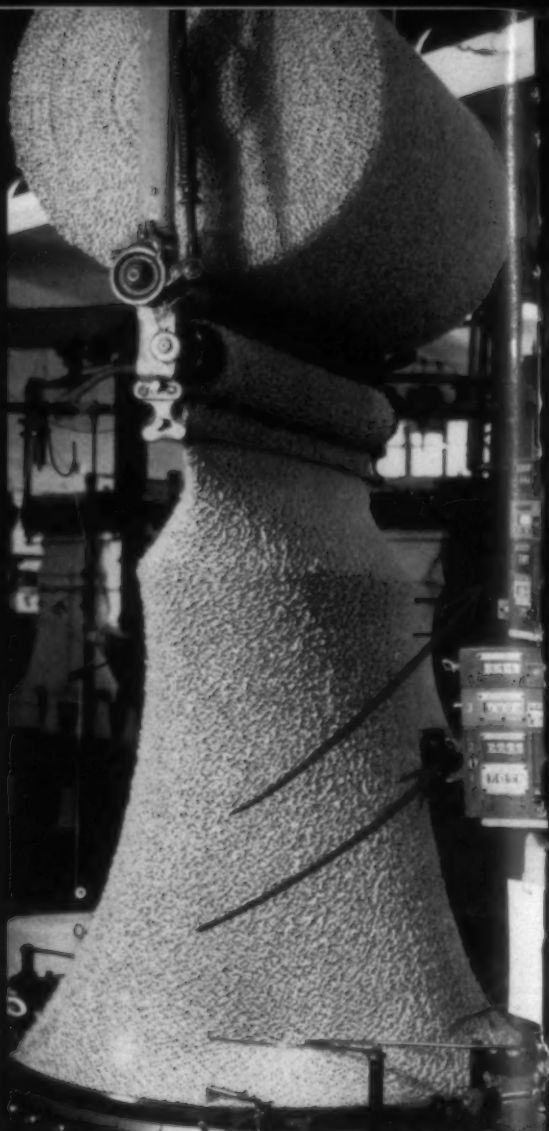
"THE NAME THAT COUNTS"



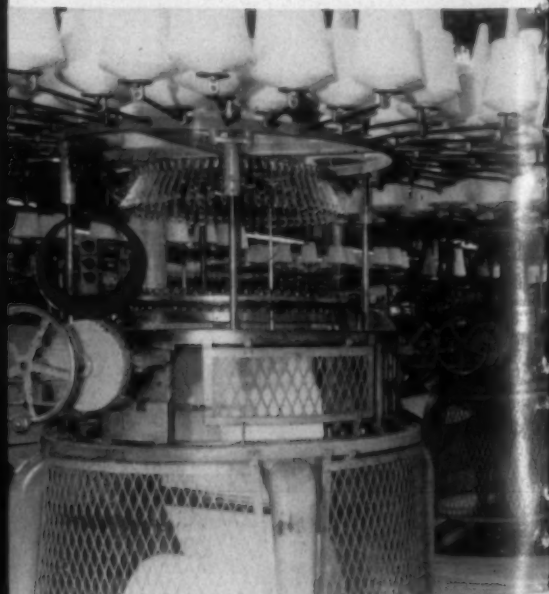
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Veeder-Root Predetermining Counter, with electrical relay, on Supreme Knitting Machine.



2-3-4 Veeder-Root Rev Counters, with Totalizers, on Cran Knitting Machine.



2-3-4 Veeder-Root Rev Counters, with Totalizers, on Supreme Knitting Machines.